



PRACTICAL ENT

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Radiology in ENT

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This is clinical Atlas of ENT with important subjects (discussed in the clinical course of ENT), covers major part of the subjects **but** not all things... Hoping it will helping you ☺

Mustafa Diaa

2018/3/2

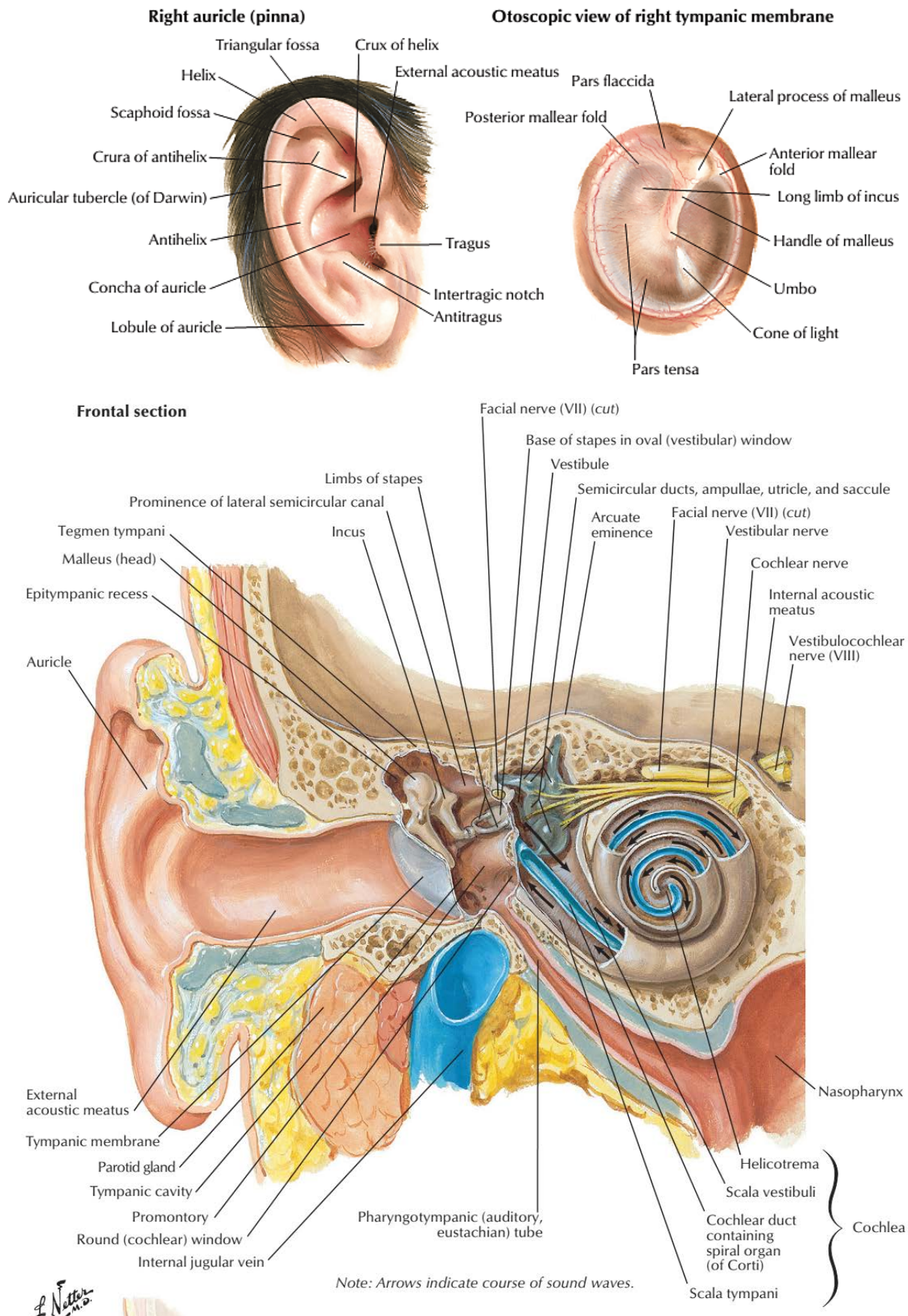
"Review Anatomy of ENT, Have idea about the ENT Examination and Practice on your Description"

The references:

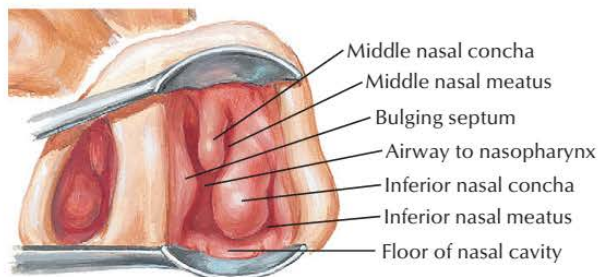
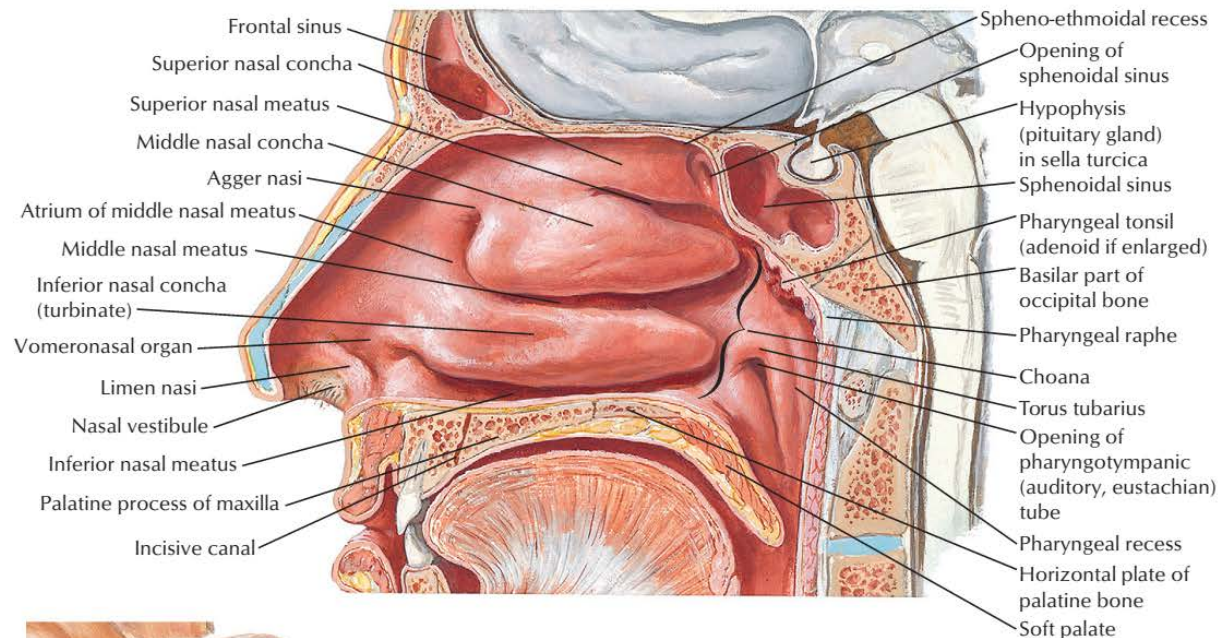
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Clinical Anatomy of ENT

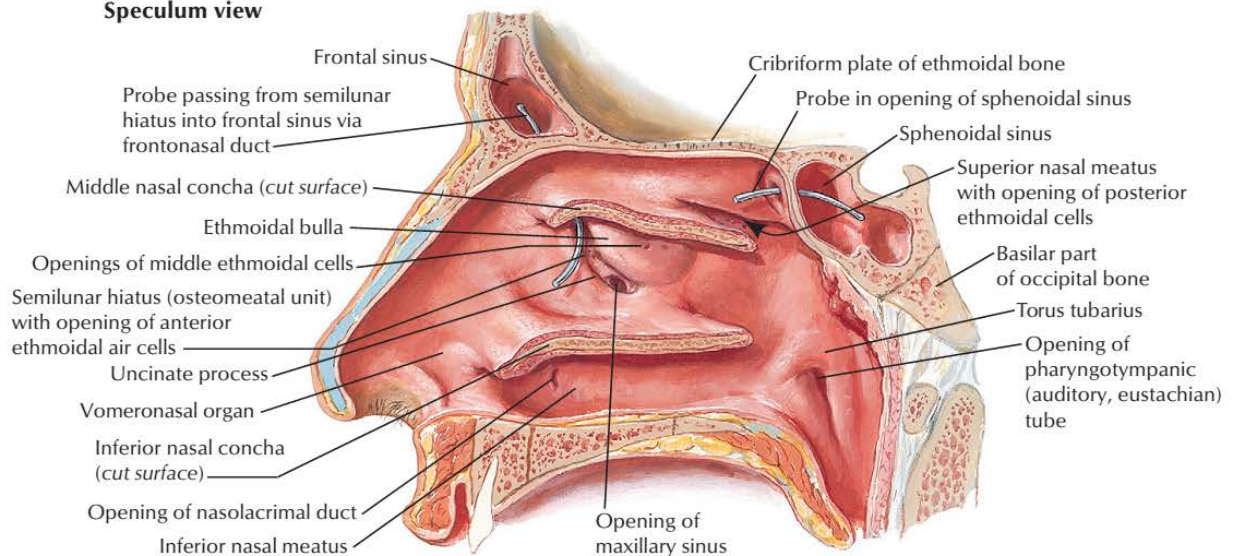
Anatomy of Ear



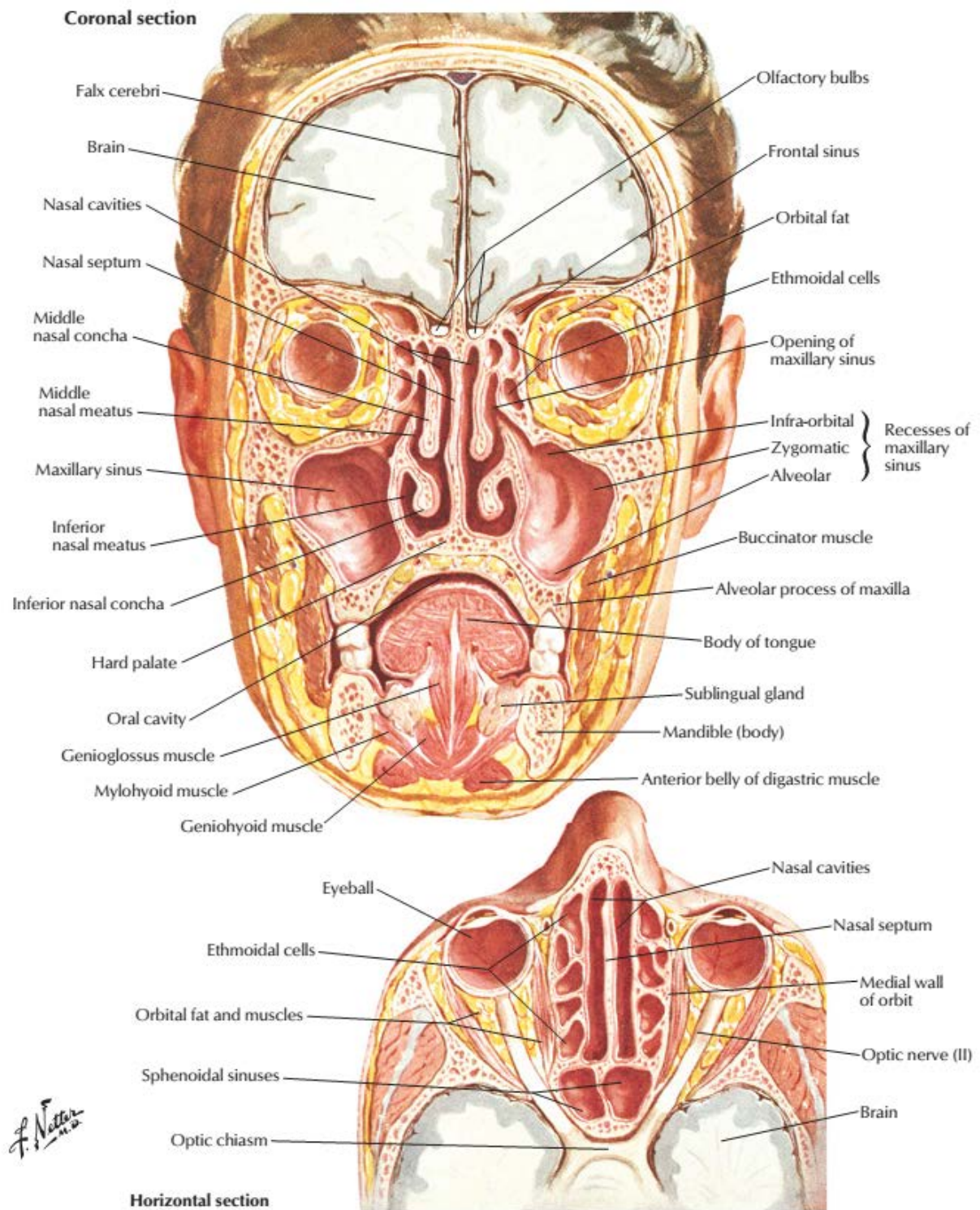
Anatomy of Nose



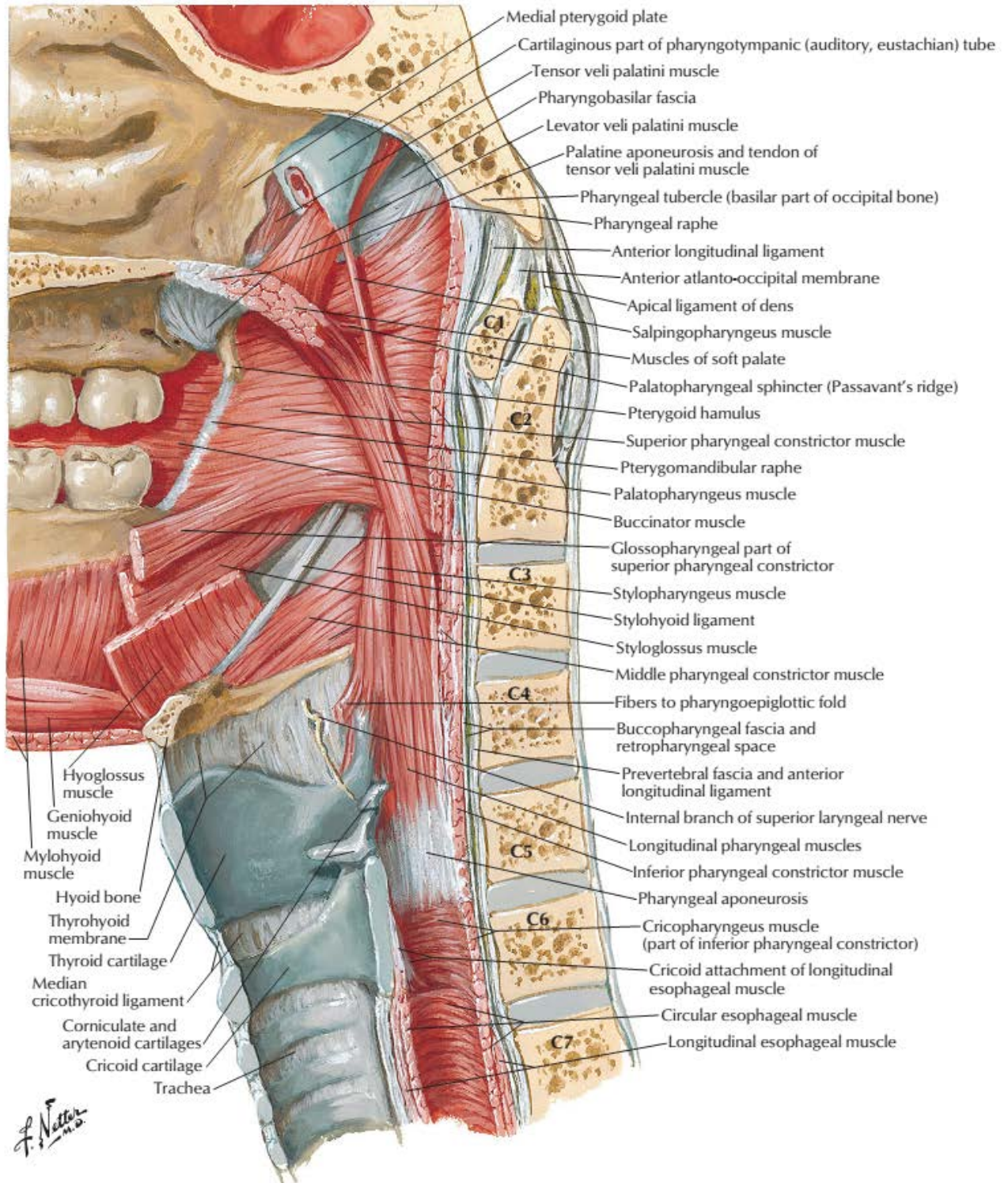
Speculum view



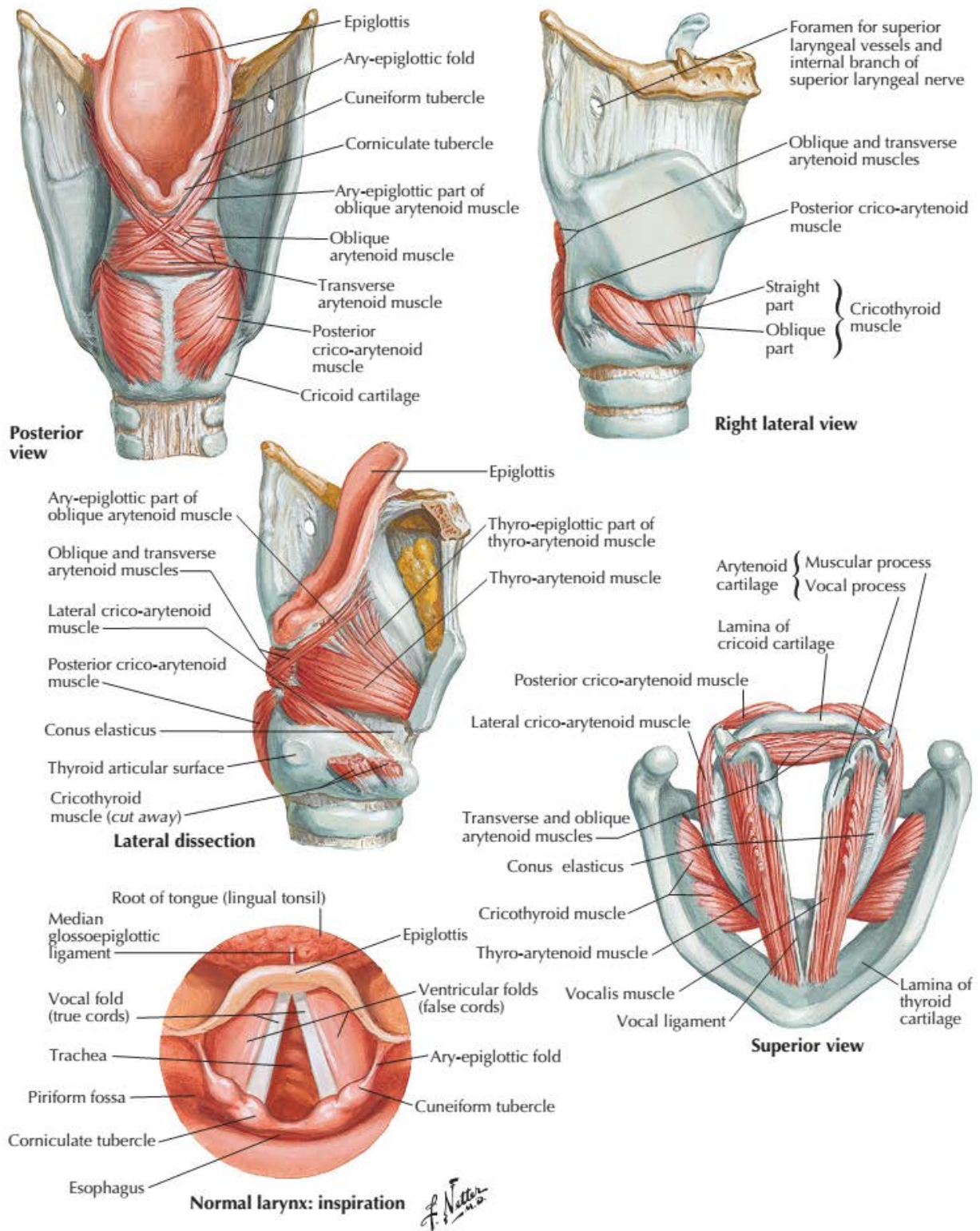
Anatomy of Para-nasal sinuses



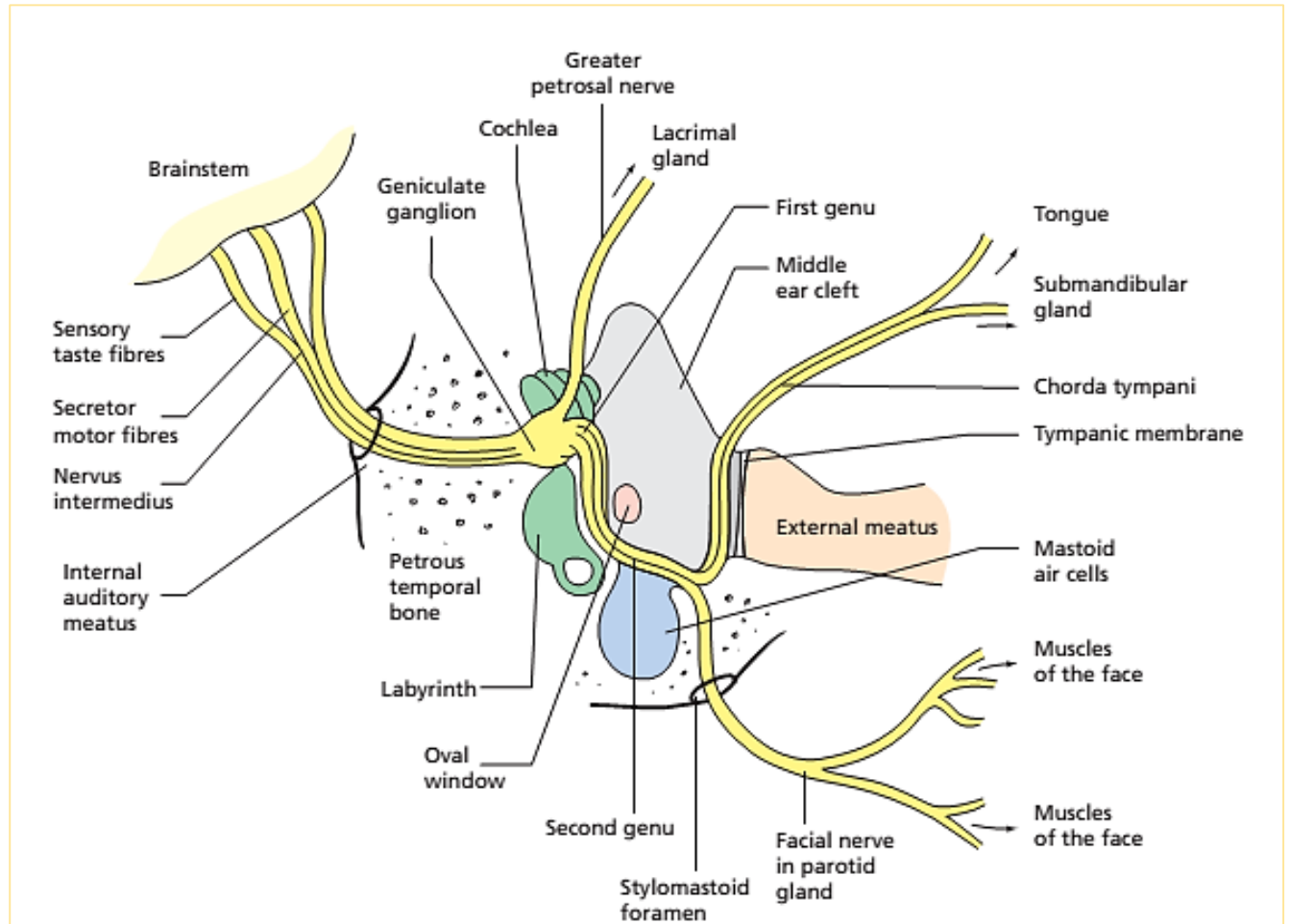
Anatomy of Pharynx



Anatomy of Larynx



Anatomy of Facial Nerve



ENT Instruments

Instruments for ENT Examination



Head Mirror with adjustable Head band

Used to focus the light from the light source for examination of the patient.

Description: Concave mirror with a focal length of 23 cm, diameter of mirror is 9 cm and size of hole is 2 cm diameter. The hole of mirror comes in front of pupil of right eye and light is focused with closed left eye to have a binocular vision



Clar's head Light

an electric head light, handy, more useful and gives strong light for examination or for operations



Bull's Eye Lamp

Uses: a source of light and heat.

Description: a 100 watt milky bulb and a convex lens with focal length of 45 cm, through which light passes on to the mirror. The lamp is placed 30 cm behind the left ear of the patient.



Thudicum's Nasal Speculum

Uses

- Diagnostic:** Anterior rhinoscopy—nasal septum, Little's area, lateral wall of nose, nasal cavity
- Therapeutic:** removal of foreign bodies, antral wash, nasal packing, surgical procedures inside the nose.

Correct method of holding nasal speculum is in the left hand suspended over the crooked left index finger, Fixed with the thumb and putting middle and ring fingers on the sides of two prongs.



Killian Nasal Speculum with handle

Uses

- Diagnostic:** Anterior rhinoscopy—nasal septum, Little's area, lateral wall of nose, nasal cavity
- Therapeutic:** removal of foreign bodies, antral wash, nasal packing, surgical procedures inside the nose.



Lack's Tongue Depressor

Uses:

- 1) Examination of oral cavity and oropharynx
- 2) To retract lips and cheek and test gag reflex
- 3) To express pus out of the tonsil and in quinsy.
- 4) For to check patency of nasal passage (Mirror test)
- 5) For **posterior rhinoscopy**
- 6) For oral cavity procedures like injection of steroids, biopsy, excision of cysts, etc.
- 7) Remove FB in throat.



Eustachian Tube Catheter (Rose's)

Uses:

- 1) To test the patency of Eustachian tube
- 2) To inflate the middle ear
- 3) To instill medications in the middle ear
- 4) To remove foreign bodies from the nose
- 5) As a suction cannula.

Description:

A wide bore beaked metallic cannula 12 to 15 cm in length. Ring on the proximal end indicates the direction of the tip of the catheter after it is in the nasopharynx.



Laryngeal Mirror (Indirect laryngoscopy mirror)

Uses: for Indirect laryngoscopic (IDL) examination of hypopharynx.

Can see

Base of tongue (BOT), valleculae, true and false cords, anterior and posterior commissures, subglottis, aryepiglottic (AE) fold and pyriform fossae, glossoepiglottic fold, pharyngoepiglottic fold.

Can't see:

Post-cricoid region, Apex of pyriform fossa, Ventricles

Undersurface of vocal cords and adjoining subglottic region

Laryngeal surface of epiglottis.

Description: a plane mirror with infinite focal length (Diameter 10–30 mm) available in size 1 to 5.



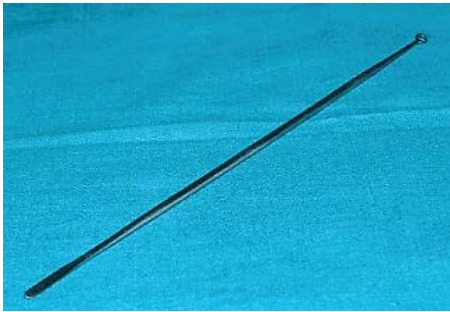
Post nasal Mirror (Posterior Rhinoscopy Mirror)

Uses: for doing posterior rhinoscopy to examine the nasopharynx.

Can see The posterior end of nasal septum and choanae, Posterior end of inferior and middle turbinates, Roof of nasopharynx, Opening of Eustachian tube and Fossa of Rosen müller.

Description: a bayonet shaped handle. The mirror should be of an appropriate size so as to pass behind soft palate and reflect sufficient light for the image to be seen. This is a plain mirror and does not magnify the image. The mirror surface is either heated or dipped in savlon (or touched against oral mucosa) in order to prevent fogging during the procedure.

The tongue is depressed gently with a tongue depressor and this mirror is introduced inside like a pen with the mirror facing upwards.



Jobson Horne Probe with Ring Curette

Uses and Description: It has two ends.

- 1) **Serrated end:**
Remove discharge or foreign bodies from EOM
Cotton swab carrier and can clean the ear or apply medication.
- 2) **Ring curette end:** remove wax, FB & debris from ear.



Ear vectis with cerumen spud

Used to remove wax and foreign bodies from the ear.

One end of this instrument has a **ring vectis** while the other end has a **blunt curette**.



Otoscope

Uses: Visualize the external auditory canal, tympanic membrane and the middle ear through the tympanic perforation.

Description:

It is a hand-held battery operated instrument. It has convex lens, which gives magnification of 2X-2.5x and also gives good illumination.

Pneumatic Attachment

Uses:

Checking the **mobility** of the TM. Can also be used for **fistula test**.



Siegel's Pneumatic speculum

Uses:

- Magnification (2X)
- Mobility of tympanic membrane
- Medicine insufflation
- Suction of discharge
- Fistula test and Gelle's test
- Check middle ear pressure

Description: The speculum has a angulated lense, which is parallel to the tympanic membrane with an ear speculum to fit into the canal, which is attached to a rubber tube and a bulb for applying suction or pressure on the drum.



Tilley Nasal Dressing Forceps

Used for

Removal of a foreign body in the nasal cavity
Nasal dressing and also for packing of gauge dressings
Open quinsy
Application of anesthesia
Carry micro instruments



Crocodile Fine Forceps

Used to

Delivery of cotton in aural toilet
Remove the disease like granulations
Cholesteatoma flakes in mastoidectomy operations and also in tympanoplasty and stapedectomy operations



Nasal Dressing Forceps

used for

Nasal dressing or for inserting and removal of packs
Removal of foreign bodies from nasal cavity



Simpson's Aural Metallic Syringe

Used for removal of wax, (otomycotic) debris or foreign bodies from external auditory meatus

Description:

Water at body temperature (37°C) should strike the wall of the meatus and not the wax or foreign body
Complications may be injury to tympanic membrane, vasovagal attack, vertigo and otitis externa



Kidney Dish

Container of medical instruments
In Aural syringing hold by patient



Hartmann Aural Speculum

Used for

Examination or operations in the external ear, tympanic membrane and middle ear.
Protect the canal from surgery by inserting instrument.

It should be introduced gently by rotation by pulling the pinna upwards, backwards and outwards in adults and downward and outward in children to straighten the meatus



Rosen aural speculum (Ear Speculum with Cut)

Used to

Inspect the external auditory meatus (EAM) and tympanic membrane™ in cases of tympanoplasty, tympanotomy and stapedectomy operations.
Its black color prevents reflection of light



Local Anesthetic Sprayer

Used to spray 10 percent xylocaine on to various areas such as nose, throat and pharynx for examination or minor surgical procedures



Operating Microscopy



Fig. 1.7A: Hartmann tuning fork



Fig. 1.7B: Gardiner tuning fork

Tuning fork (Hartmann's or Gardiner Brown)

Used for

Testing the type of hearing loss, whether conductive or sensorineural hearing loss

Mostly 512 Hz tuning fork is used because it falls in mid speech frequency and its sound lasts longer because of its slow decaying and it produces minimal overtones.

Various tuning forks are 128 Hz, 256 Hz, 512 Hz, 1024 Hz, 2048 Hz, 4056 Hz



Barany noise box

Masking one ear to examine the other ear



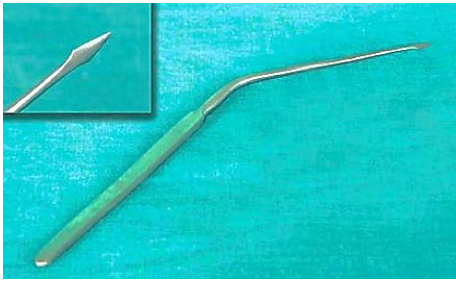
Dissecting Forceps (nontoothed)

- 1) To hold structures and restrict their movement
- 2) To hold small swabs



Dissecting Forceps (toothed)

To grasp object or tissue and move or release it



Politer Myringotomy Knife

Used to

Give a cut in TM in secretory otitis media and unresolved acute suppurative otitis media (ASOM)

Also used in uncinectomy operation in functional endoscopic sinus surgery (FESS)

The incision may be in the anteroinferior quadrant for serous otitis media or posteroinferior quadrant for acute otitis media. The incision is radial for serous otitis media and circumferential for acute otitis media. Ventilation tube may be inserted on this incision if required in serous otitis media.



Bayonet Myringotomy Knife

Used in secretory otitis media and ASOM for giving incision in TM

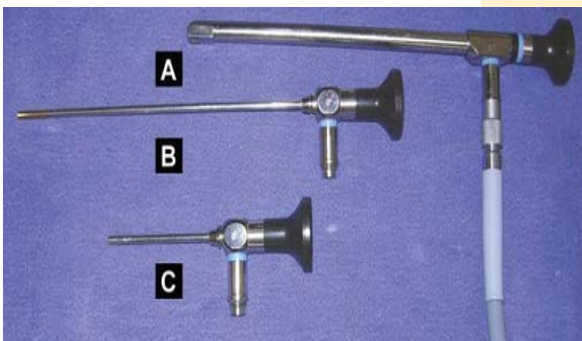


Tilley Lichwitz Antrum Trocar with cannula

Used

Doing proof puncture through inferior meatus or through canine fossa in chronic maxillary sinusitis.

For antral wash out



Rigid Endoscope

A. Laryngoscope

B. Nasal endoscope

Uses:

Examine Nose and postnasal space

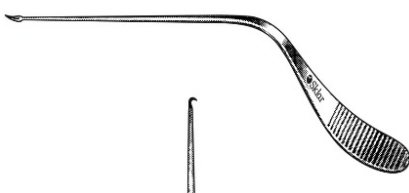
Diagnostic or functional endoscopic sinus surgery (DESS or FESS) in cases of Chronic sinusitis, Nasal polypi, Cerebrospinal fluid (CSF) rhinorrhea.

C. Oto-endoscope: examination of ear

Fiberoptic Nasal/Nasolaryngeal endoscope

Flexible Fiberoptic Endoscope

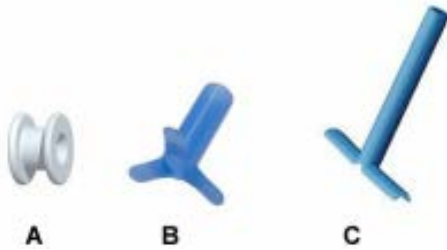
Examine Nose, postnasal space, pharynx and larynx.



Zollner's Knife

used to

give cut in the deep meatal skin for making tympanomeatal flap and in stapedectomy operation


Zoellner Suction Tube for ear

Grommet tubes (ventilation tube)

Ventilation of middle ear (spare the function of EuT)
T-tube is used for longer term and needs skillful hands: down syndrome, cleft palate, adult ear that refuses grommet spontaneously within 6 months


Asch's Forceps

Used to
Treat fractures of nasal septum


Walsham's Forceps

used to
Disimpact and reduce the nasal bone fractures
In rhinoplasty operation

Hearing Aids

Definiton: Sound amplification systems helping the deaf patient to overcome his deafness.

Types:

1. Air conduction HA: Behind the ear HA, In the ear HA.
2. Bone conduction HA: Bone anchored HA.
3. Cochlear nerve stimulator: Cochlear implant

Indications:

1. Congenital deafness
2. Acquired deafness
3. Bilateral profound sensory Hearing loss: cochlear implant


Behind the ear hearing aid

Bone Anchored hearing aid

Cochlear implant

Blank paper

Tracheostomy

Definitions:

- Tracheotomy is an operation to make an opening in the trachea.
- Tracheostomy means converting this opening to a stoma on the skin surface.

Features:

1. The material From which they are made:

A. Metal

- 1) **Silver.** An alloy of silver, copper and phosphorus, e.g. Fuller, Negus or Jackson's tube.

B. Synthetic

- 2) **PVC (polyvinyl chloride).** They are disposable, single use tubes and thermolabile, and thus adjust to tracheal lumen.
- 3) **Silicone.** Bacteria and secretions do not adhere to the tube and there is minimum of crusting.
- 4) **Siliconized PVC.** It has the properties of both PVC and silicon.
- 5) **Silastic.** It is soft and nonirritating, and minimizes crusting.
- 6) **Armoured tubes.** They are plastic tubes reinforced by a spiral or rings of stainless steel. They are not easily kinked.

2. Cuff:

- 1) **Uncuffed**
- 2) **Cuffed tubes**
- 3) **Double cuff tube.** Each cuff can be inflated alternately to prevent pressure necrosis at one site.

3. Fenestrate:

- 1) **Non- fenestrated:** Used where there is a danger of aspiration *or* where the position or structure of the cords does not allow the production of useful voice.
- 2) **Fenestrated tube.** Single or multiple holes are situated at the upper curvature. The hole(s) help in speech production or in weaning from tracheostomy. Fenestrated tube is used in children for decannulation. In patients who have medialized and immobile cords where air cannot be inhaled in the usual manner (hence the need for a tracheostomy).

4. Adjustable flange:

- 1) **Non- Adjustable flange**
- 2) **Adjustable flange long tube.** Extra length tracheostomy tubes are used when pretracheal tissues are thick or swollen or to by-pass a growth or stenosis in trachea. Flange in these cases can be adjusted.

5. Lumen:

- 1) **Single lumen tube.** There is no inner cannula
- 2) **Double lumen tube.** They have an inner cannula inside an outer cannula. It is easier to remove, clean and replace the inner cannula, keeping outer cannula in place for breathing.
- 3) **Suction-aid tracheostomy tubes.** They have a small tube ending above the cuff to suck out pharyngeal secretion and prevent their aspiration.

6. **Speaking valve:** A valve is fitted at the outer end of tracheostomy tube. It is used in long-term treatment of bilateral abductor paralysis or laryngeal stenosis. Digital closure of tracheostomy tube to speak is thus avoided.

Types:

A. Metal Tubes: Usually made of inert silver, **Used** in the long-term tracheostomized patient.

1. Chevalier Jackson's tracheostomy tube

- It is made of German silver, (non-irritant)
- It has three parts:
 - 1) **Outer tube:** a shield and lock for the inner tube.
 - 2) **Inner tube:** is longer than outer tube (by 2–3 mm) which can be removed, cleaned and reinserted.
 - 3) **An obturator:** has a blunt olive tip. It is used for non-traumatic insertion of tube into the trachea.
- Used in patients with thin necks.



2. Fuller's tracheostomy tube

- It has two parts:
 - 1) **Outer tube:** is made of two blades, which when pressed together, can be easily introduced into the tracheostomy opening.
 - 2) **Inner tube:** slightly longer, has a hole in the centre so that patient can still have a chance to breathe from the larynx even when tube is blocked at its outer end.



3. The Durham tube

- Has an adjustable flange so that it can be used in patients with either thin or very fat necks.

4. The Koenig tube

- Has a long flexible wire that can be used if there is a narrowing of the trachea.

5. The Alder Hey tube

- A typical example of a paediatric metal tube: both the inner and outer tubes are fenestrated and a valve is available to allow transglottic expiration and speech.

B. Synthetic Tubes

- Disposable tubes
- **Used** when the tracheostomy is temporary or when a cuff is required to protect the lower respiratory tree, or when artificial ventilation is required.

1. Portex tracheostomy tube

- 1) **Cuffed:** All cuffed tubes are made of plastic.

Use: Used if positive pressure ventilation is required or if there is a danger of contamination of the lower airways with blood, saliva or gastric contents.

Description

- The cuff has a **pilot bulb** outside, to know if it is inflated and an **obturator** as a guide. Cuff should be deflated every 2 h for 5 min to prevent damage to trachea and cartilage necrosis.
- The balloon prevents air or fluid leaking around the tube and prevents aspiration of pharyngeal secretions into the trachea.
- There is a **blue line** impregnated with barium to make the tube radiopaque.
- Approximate size of tracheostomy tube can be calculated by the following formula:
 - Under 12 years of age = $[(\text{Age} / 4 + 4.5) \times 4] + 2$
 - For more than 12 years = Adult male: size 30 to 38
 - Adult female = Size 34 to 38.

2) **Non-cuffed:** In all other situations. A non-cuffed tube is generally preferred, since prolonged inflation of the cuff can lead to damage to the tracheal lining and subsequent tracheal stenosis.



2. Cuffed suction – aid tracheostomy tube

- Has a suction tube which reaches above the cuff.
- It helps to suck out pharyngeal secretion collected above the cuff. Suction should always be done before deflating the cuff so that accumulated pharyngeal secretions do not get aspirated into the trachea.



3. Paediatric synthetic tubes

- These are smaller and softer than the adult tubes.
- Have a curve and flanges for tape attachment, which better fit the infant neck and trachea
 - 1) Franklin tube of Great Ormond Street tube
 - 2) Portex paediatric tube
 - 3) Shiley paediatric or neonatal tube.

Emergency airway procedures

1. Endotracheal intubation

- This is the first-line treatment for acute airway obstruction
- On occasions, endotracheal intubation may not be possible due to poor access, inadequate equipment or unskilled staff. In this situation, other manoeuvres are needed to establish an airway.

2. Cricothyroidotomy

- A hollow tube is introduced into the lumen of the larynx via a percutaneous route.
- The easiest and most commonly available instrument, at least in the hospital setting, is a wide-bore intravenous cannula. This is inserted into the neck in the midline through the cricothyroid membrane.

3. Tracheostomy

• Functions of Tracheostomy

- 1) **Alternative pathway for breathing** in any obstruction in the upper airway
- 2) **Improves alveolar ventilation** in cases of respiratory insufficiency by:
 - Decreasing the dead space by 30–50% (normal dead space is 150 mL).
 - Reducing the resistance to airflow.
- 3) **Protects the airways** in case:
 - Pharyngeal secretions, as in case of bulbar paralysis or coma.
 - Hemorrhage from pharynx, larynx or maxillofacial injuries.
- 4) **Permits removal of tracheobronchial secretions** in case:
 - Unable to cough as in coma, head injuries, respiratory paralysis
 - Cough is painful, as in chest injuries or upper abdominal operations
- 5) **Intermittent positive pressure respiration (IPPR)**
- 6) **To administer anesthesia** in cases where endotracheal intubation is difficult or impossible.

• Indications of Tracheostomy

1) Respiratory obstruction

(a) Infections

- Acute laryngo-tracheo-bronchitis, acute epiglottitis, diphtheria
- Ludwig's angina, peritonsillar, retropharyngeal or parapharyngeal abscess, tongue abscess

(b) Trauma

- External injury of larynx and trachea
- Trauma due to endoscopies, especially in infants and children
- Fractures of mandible or maxillofacial injuries
- swallowing corrosive, inhalation of irritants

(c) Neoplasms

- Benign and malignant neoplasms of larynx, pharynx, upper trachea, tongue and thyroid

(d) Foreign body larynx

(e) Oedema larynx

- Due to steam, irritant fumes or gases, allergy (angioneurotic or drug sensitivity), radiation

(f) Bilateral abductor paralysis (VC paralysis)

(g) Congenital anomalies

- Laryngeal web, cysts, subglottic stenosis
- Tracheo-oesophageal fistula

2) Retained secretions

(a) Inability to cough

- Coma of any cause, e.g. head injuries, cerebrovascular accidents, narcotic overdose
- Paralysis of respiratory muscles, e.g. spinal injuries, polio, Guillain–Barre syndrome, myasthenia gravis
- Spasm of respiratory muscles, tetanus, eclampsia, strychnine poisoning
- Head and neck surgery (oral or oropharyngeal resections, supraglottic laryngectomy).

(b) Painful cough

- Chest injuries, multiple rib fractures, pneumonia

(c) Aspiration of pharyngeal secretions

- Bulbar polio, polyneuritis, bilateral laryngeal paralysis

3) Respiratory insufficiency

(a) Chronic lung conditions: emphysema, chronic bronchitis, bronchiectasis, atelectasis

(b) Neurological diseases (as above).

(c) Severe chest injury (flail chest).

• Complications

1. Immediate (first 24 hour)

- 1) Anaesthetic complications.
- 2) Damage to local structures (cricoid cartilage, recurrent laryngeal nerve, oesophagus, brachiocephalic vein).
- 3) Cardiac arrest.
- 4) Primary haemorrhage.

2. Intermediate (1 – 14 days)

- 1) Dislodgement/displacement of the tube.
- 2) Surgical emphysema.
- 3) Pneumothorax.
- 4) Obstruction of the tube or trachea (excessive crusting).
- 5) Infection (perichondritis, wound infection, secondary haemorrhage).
- 6) Tracheal necrosis (may lead to tracheal stenosis or tracheo-oesophageal fistula).

3. Late (> 14 days)

- 1) Subglottic and tracheal stenosis.
- 2) Decannulation difficulty.
- 3) Tracheocutaneous fistula.
- 4) Scar (hypertrophic or keloid).

Postoperative care

1. **Position:** semi sitting
2. **Constant supervision** for bleeding, displacement or blocking of tube and removal of secretions is essential. Patient is given a bell or a paper pad and a pencil to communicate.
3. **Suction**
 - Depending on the amount of secretion, suction may be required every half an hour or
 - Use sterile catheters with a Y-connector to break suction force.
4. **Prevention of crusting and tracheitis**
5. **Proper humidification**, by use of humidifier, steam tent, ultrasonic nebulizer or keeping a boiling kettle in the room.

➡ If crusting occurs, a few drops of normal or hypotonic saline or Ringer's lactate are instilled into the trachea every 2–3 h to loosen crusts. A mucolytic agent such as acetylcysteine solution can be instilled to liquify tenacious secretions or to loosen the crusts.
6. **Apnea:** Some patients with chronic obstructive airways disease may develop apnoea following restoration of their airway. These patients need monitoring and the administration of carbon dioxide via a flowmeter through the tracheostomy if necessary.
7. **Care of tracheostomy tube**
 - Inner cannula should be removed and cleaned as and when indicated for the first 3 days.
 - Outer tube, unless blocked or displaced, should not be removed for 3–4 days to allow a track to be formed when tube placement will become easy. After 3–4 days, outer tube can be removed and cleaned every day. If cuffed tube is used, it should be periodically deflated to prevent pressure necrosis or dilatation of trachea.
8. **Decannulation**
 - Prolonged use of tube leads to tracheobronchial infections, tracheal ulceration, granulations, stenosis and unsightly scars.
 - To decannulate a patient, tracheostomy tube is plugged and the patient closely observed. If the patient can tolerate it for 24 h, tube can be safely removed.
 - In children, the above procedure is done using a smaller tube. After tube removal, wound is taped and patient again closely observed.
 - Healing of the wound takes place within a few days or a week.

Assessment of Hearing and Balance

Definitions

- **Audiology:** Is the study of hearing, speech and balance disorders.
- **An Audiologist** is a "hearing health care professional" who identifies and assesses individuals with auditory (hearing) and/or balance concerns problems.

Hearing Assessment

A. Clinical Tests

1. **Speech Test:** The distance at which conversational voice and the whispered voice are heard is measured.

2. **Tuning Fork tests**

- a. **Rinne Test:** air conduction of the ear is compared with its bone conduction.

- 1) **Bone Conduction:** a vibrating tuning fork is placed on the patient's mastoid and when he stops hearing, it is brought beside the meatus.



- 2) **Air Conduction:** a vibrating tuning fork is brought beside the meatus. If he still hears, AC is more than BC.



Results:

- **Positive:** AC is longer or louder than BC. It is seen in normal persons (or those having sensorineural deafness).
- **Negative:** (BC > AC) is seen in conductive deafness.
- **False negative Rinne:** It is seen in severe unilateral sensorineural hearing loss. Patient does not perceive any sound of tuning fork by air conduction but responds to bone conduction testing. This response to bone conduction from the opposite ear. In such cases, correct diagnosis can be made by masking the nontest ear with Barany's noise box.

- b. **Weber Test**

- A vibrating tuning fork is placed in the middle of the forehead or the vertex and the patient is asked in which ear the sound is heard.



Results:

- **Normal:** it is heard equally in both ears.
- **Lateralized to The worse ear** in conductive deafness
- **Lateralized to The better ear** in sensorineural deafness.

Test	Normal	Conductive deafness	SN deafness
Rinne	AC > BC (Rinne positive)	BC > AC (Rinne negative)	AC > BC
Weber	Not lateralized	Lateralized to poorer ear	Lateralized to better ear

3. Reflex test

- Age: **0-6 months**. In this subjective test, changes in activity are observed in response to a sound stimulus.
- Response behaviors in:
 - ⇒ **Infants up to four months** might include eye widening, eye blink (auropalpebral reflex), arousal from sleep, startle or definite movement of the arms, legs or body.
 - ⇒ **From four to seven months**, lateral inclination of the head towards the sound or a listening attitude or stilling may be observed.

4. Distraction test

- Age **6-18 months**. It is a subjective test based on the principle that the normal response observed when sound is presented to a baby is a head turn to locate the source of sound.
- The test is suitable for babies from 6 to 18 months, corresponding to the stage when the child can sit erect unsupported and perform head turns in a horizontal plane.

5. Conditioning or performance test

- Age: **2-5 years**. It is a subjective test follows the simple principle that the child is conditioned to wait for a sound and then to respond with a toy takes it from a table in front of the child.

B. Audiometric Test

1. Pure Tone Audiometry:

Type and age: subjective test, 3 years onwards

Audiometer: an electronic instrument used for PTA

The audiogram: a graph which indicates specific frequencies (pure tones) and intensity levels (in **decibels**, dB) which identify what a person can hear in each ear individually.

Uses:

- It is a measure of threshold of hearing by air and bone conduction and thus the degree and type of hearing loss.
- Pattern of curve points towards a disease such as otospongiosis, acoustic trauma, Ménière's disease and presbycusis.
- A record can be kept for future reference.
- Audiogram is essential for prescription of hearing aid.
- Helps to find degree of handicap for medicolegal purposes.

Procedure:

- Pure tones are given at various frequencies by increasing the intensity at 5 dB steps; and when the patient just hears the sound, it is recorded.
- Frequencies between 500 Hz and 3,000 Hz are important as these are the speech frequencies.
- Average hearing threshold at 500, 1,000 and 2,000 Hz is called **Pure-tone average**.

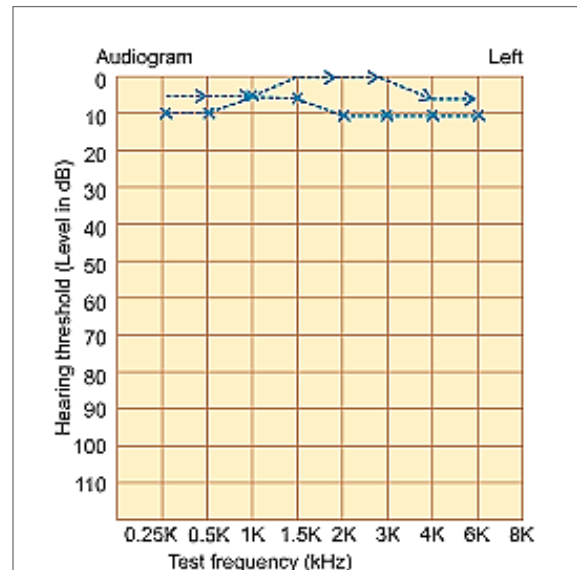


Signs used are:

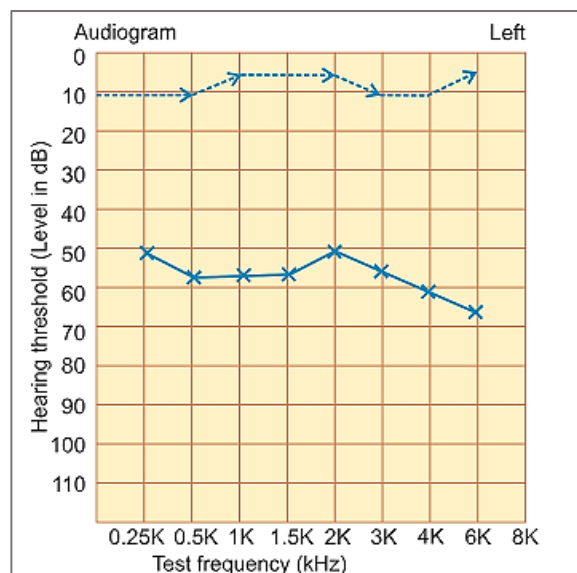
- O AC right ear X AC left ear
- Δ AC masked □ AC masked
- < or [BC right ear > or] BC left ear

Result:In normal persons:

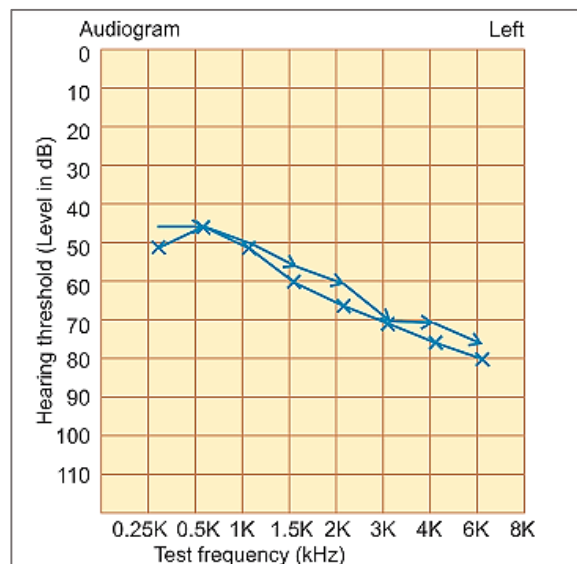
- Hearing threshold values with air and bone remain between 0 and 20 dB
- No A-B gap.

Conductive deafness

- BC testing under 20 dB (normal)
- AC much below level depending upon the severity (abnormal).
- **Bone-air gap of more than 15 dB**
- Types:
 - 1) *Left sloping* in otosclerosis.
 - 2) *Right sloping* in secretory otitis media.
 - 3) *A large air bone gap* in ossicular chain disruption.

In SNHL

- Both BC and AC values drop down and no gap, may even overlap each other.
- Types:
 - 1) *Ascending type* in endolymphatic hydrops.
 - 2) *Descending type* in ototoxicity.
 - 3) *Trough shape* is a feature of congenital SNHL.

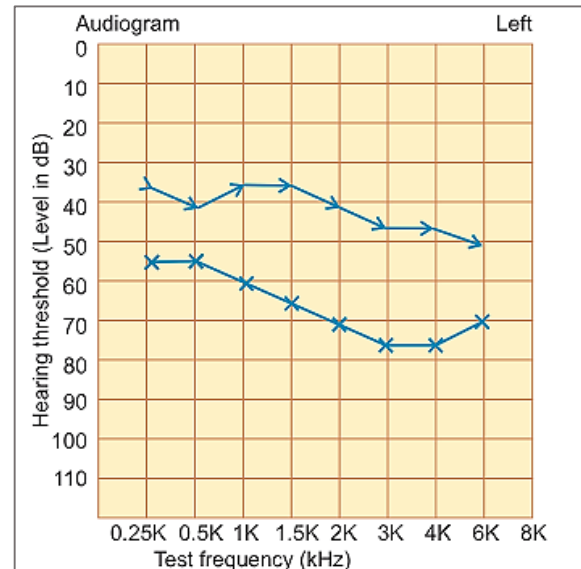


Mixed deafness

- Both BC and AV values drop
- **Air-bone gap**

Percentage of hearing impairment

- 26 to 40 dB; mild hearing loss.
- 41 to 55 dB; moderate hearing loss.
- 56 to 70 dB; severe hearing loss.
- 71 to 90 dB; profound hearing loss.
- Above 91 dB; near total hearing loss.
- No hearing; total loss.



2. **Speech Audiometry** (*subjective test*) is a key component of audiologic assessment, because it uses the kinds of auditory signals (words) present in every day communication instead of pure tone.

⇒ Advantages

- D/D of organic and functional hearing loss
- D/D of cochlear and retrocochlear hearing loss
- Helps in fitting of proper hearing aid.

3. **Impedance Audiometry** (*Objective tests*)

A. Tympanometry

Tympanometer: an electronic instrument used to measure the impedance (means resistance) offered by the middle ear conducting apparatus such as tympanic membrane (TM) and ossicular chain.

Tympanogram: the chart in which the results of tympanometry are displayed.

Uses:

- 1) Measure the pressure in the middle ear where air pressure in the ear canal is varied
- 2) Test the condition and movement of the tympanic membrane.

Procedure: By changing the pressures in a sealed external auditory canal and then measuring the reflected sound energy, it is possible to find the compliance or stiffness of the tympano-ossicular system and thus find the healthy or diseased status of the middle ear.

Types

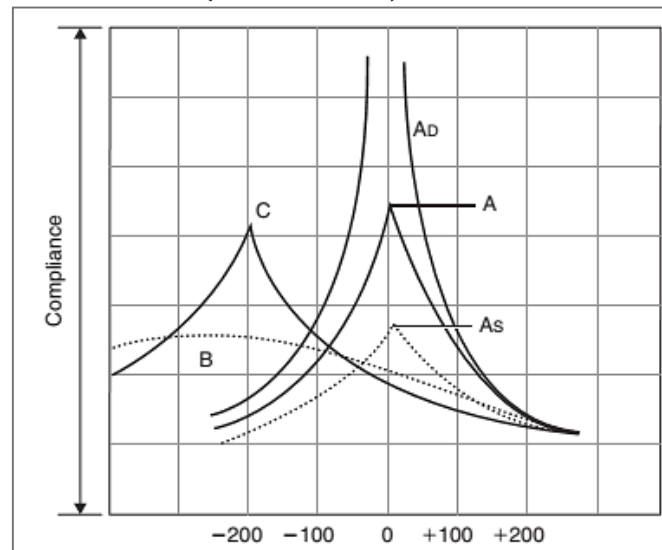
- 1) **A**—Normal.

- **As**—Reduced compliance at ambient pressure. 's' stands for shallow tympanogram but remember for stiffness. Seen in fixation of ossicles, e.g. otosclerosis or malleus fixation.
- **Ad**—Increased compliance at ambient pressure. 'd' stands for deep tympanogram. Remember disruption of ossicular chain. Seen in ossicular discontinuity or thin and lax tympanic membrane.

- 2) **B**—Flat or dome-shaped. Seen in middle ear fluid or thick tympanic membrane.



- 3) **C** — Maximum compliance occurs with negative pressure in excess of 100 mm H₂O. Seen in negative pressure in middle ear, e.g. eustachian tube obstruction or early stage of otitis media with effusion (TM retracted).



B. Acoustic Reflex refers to the involuntary muscle contraction within the middle ear. It normally occurs in response to high-intensity sounds to protect the ear.

Procedure: It is based on the fact that a loud sound, 70–100 dB above the threshold of hearing of a particular ear, causes bilateral contraction of the stapedial muscles which can be detected by tympanometry.

Uses:

1. To test the hearing in infants and young children.
2. To find malingerers
3. To detect cochlear pathology.
4. To detect VIIIth nerve lesion.
5. Lesions of facial nerve.
6. Lesion of brainstem.

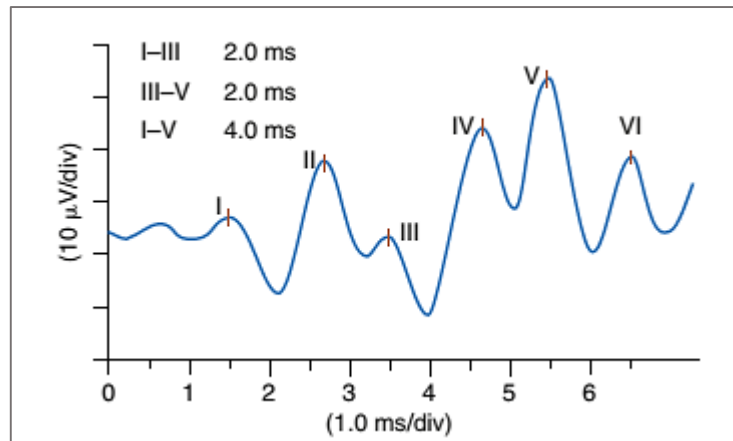
C. Special Tests

1. Auditory Brainstem Response (ABR) [brainstem evoked response audiometry]

Type: objective test

Procedure:

- This test focuses on changes and responses in brain waves that are stimulated by a clicking sound to evaluate the auditory pathways.
- By means of computer averaging, it is possible to extract the tiny electrical voltages, or potentials, evoked in the brain by acoustic stimulation.
- The test is performed by placing the patient reclining in a chair or bed. The patient is asked to relax and remain still and in child the test done during sleep.
- Electrodes are placed on the patient's scalp, along the vertex and on each earlobe.
- The patient hears clicking noises or tone bursts through earphones, and the electrodes pick up the brain's response and record it on a graph.
- In a normal person, seven waves are produced in the first 10 ms. **The first, third and fifth waves** are most stable and are used in measurements.



Applications:

1. Prediction of hearing sensitivity.
2. Infant hearing screening.
3. Diagnostic assessment of central auditory nervous system.
4. Monitoring of auditory nervous system function during surgery.

2. Otoacoustic Emissions (OAE)

Type: Objective test

Uses:

1. Infant screening
2. Pediatric assessment
3. Cochlear function monitoring

Procedure:

- Otoacoustic emissions are low-intensity sounds that are generated by the cochlea and emanate into the middle ear and ear canal. There are two types of otoacoustic emissions:
 - a. Spontaneous OAEs (SOAEs)
 - b. Evoked OAEs (EOAEs)

Balance Assessment

- a. **Videonystagmography (VNG):** It's a basic objective balance test that physicians will order when treating patients with symptoms of dizziness or vertigo. VNG used to record nystagmus, which is an involuntary eye movement and can be generated by the peripheral vestibular system associated with each ear. So what we are recording then is known as the **vestibular ocular eye reflex**.
- b. **Bithermal water caloric test:** It's an objective test to assess vestibular function. Warm & cool water irrigation of external auditory canal skin and tympanic membrane, change temperature transmitted to endolymph in horizontal semicircular canal this cause nystagmus through vestibulo-ocular reflex, absence of response mean nonfunctioning cochlea as in Menieres disease.

Causes of Acquired hearing loss

- 1) **Conductive Hearing loss:** any disease process interfering with the conduction of sound from the external ear to the stapediovestibular joint.
 - a) **The external ear (obstructions):** Foreign bodies, Wax, Otomycosis, Otitis externa, congenital atresia or stenosis, Tumors.
 - b) **Tympanic membrane (perforation)**
 - c) **Middle ear (fluid):** Otitis media (OM), Nonsuppurative OM, Tuberculosis/syphilis, Otosclerosis, Tumors.
 - d) **Ossicles (fixation or disruption)**
 - e) **The eustachian tube (obstruction):** E tube catarrh, Barotrauma

- 2) **Sensorineural Hearing loss:** It results from lesions of:
 - a) **The cochlea (sensory type):** Head injuries, Viral infections (Mumps, measles, Herpes), Noise trauma, Tumors (Acoustic neuroma), Ménière disease, Ototoxicity, Presbycusis.
 - b) **VIIIth nerve and its central connections (neural type):** Hypertension Cerebrovascular accident (CVA), Diabetes, Hypothyroidism, Smoking and alcoholism, psychogenic deafness.

- 3) **Mixed Hearing loss:** Blast injury, chronic suppurative otitis media (CSOM), Otosclerosis.

Blank paper

Common cases of the Ear

1. Congenital Anomalies of Pinna

1) Anotia

Complete absence of pinna

Treated by plastic reconstruction or by prosthesis

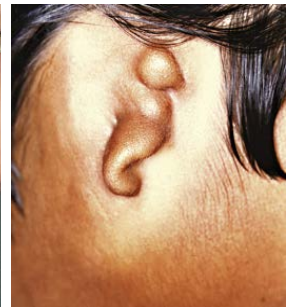


2) Microtia

Very small deformed pinna and may be associated with other anomalies of ear

Treatment:

- Prosthetic ear attached by bone anchored Titanium screw
- Hearing Aid



3) Accessory Ear lobule/Auricles

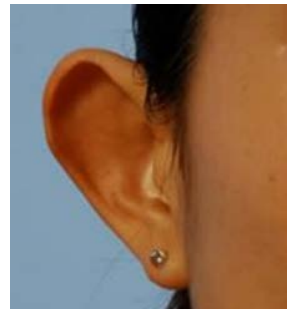
Preauricular tags or appendages (Polyotia): multiple tags of skin and cartilage around the pinna and can be seen on a line drawn from tragus to the angle of mouth.



4) Bat Ear (Protruding Ear)

Abnormal anteriorly placed pinna due to absence of anti-helical fold of the ear

Treatment: Surgical correction after the age of 6 years, if cosmetic appearance so demands.



5) Waardenburg's Syndrome

Patient with 1) Telecanthus, 2) Pigmented disorders 3) Heterochromia iridis 4) SNHL



6) Crouzon's Syndrome

Patient with 1) Hypoplastic mandible and maxilla, 2) Parrot beak nose 3) Craniostenosis, 4) Exophthalmus, 5) Associated with external, middle ear abnormalities



7) Cup ear: hypoplasia of upper third of the auricle.

8) Cryptotia (Pocket ear): Upper third of the auricle is embedded under the scalp skin.

2. Pre-auricular Sinus

Description: Photograph of pinna show redness and induration in front of the crus of helix with small pit in the site most likely inflamed preauricular sinus.

Definitions:

- **Preauricular pit** is a depression in front of the crus of helix or above the tragus.
- **Preauricular sinus:** Blind tracks in front of ear lined by squamous epithelium occur due to incomplete fusion of tubercles of 1st and 2nd branchial arch.

C/F: symptoms occur only when infected, i.e. pain, increase in temperature, swelling and discharge.

Treatment: After treating the acute symptoms, the track is outlined by a dye and is excised if the sinus gets repeatedly infected, avoiding injury to facial nerve.



3. Auricular Hematoma

Description: Photograph of pinna show red swelling of pinna with loss of pinna landmarks.

Cause: Blunt trauma to the pinna may result in a subchondral hematoma.

C/F:

- A fluctuant swelling appears under the skin.
- No constitutional symptoms unless an infection supervenes.

Treatment:

- Incision and drainage and proper compression of the wound to prevent accumulation of blood or fluid.
- Antibiotics to prevent secondary infection



Complications:

- If haematoma gets infected, **severe perichondritis** may set in.
- If haematoma not treated may lead to **cauliflower ear** also called Boxer's ear.

Cauliflower ear

Cause: Auricular hematoma

- Collection of blood or fluid under perichondrium separate cartilage from perichondrium. Since the cartilage gains its nutrient supply from the overlying perichondrium, an untreated pinna haematoma results in cartilage necrosis and permanent deformity.

Treatment: Cosmetic Surgery



4. Perichondritis

Description: Photograph of pinna show diffuse swelling of pinna, surface is red and shiny with yellowish discharge in concha.

Definition: inflammation of the perichondrium covering the cartilage of the pinna.

Cause:

- 1) Infection secondary to lacerations, haematoma or surgical incisions.
- 2) Extension of infection from diffuse otitis externa or a furuncle of the meatus.

C/F:

- Initial symptoms are red, hot and painful pinna which feels stiff.
- Later abscess may form between the cartilage and perichondrium

Treatment:

- 1) Systemic antibiotics and local application of 4% aluminium acetate compresses.
- 2) Anti-inflammatory drugs such as ibuprofen or paracetamol.
- 3) Once abscess is formed incision and drainage has to be done.



5. Impacted Wax

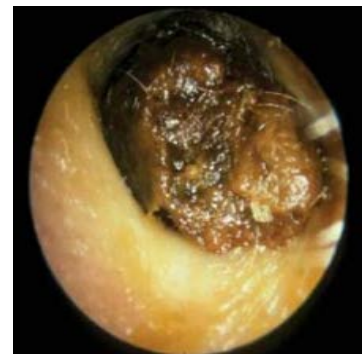
Description: Photograph of External auditory canal show impacted wax.

C/F:

- Sense of blockage, itchiness, earache
- Hearing is diminished, tinnitus and vertigo.
- Most common cause of hearing impairment

Treatment:

- Removal by **Ear syringing** (with sterile normal saline water at body temperature) or **instrumental manipulation** (Cerumen hook, scoop or Jobson Horne prob)
- If hard, it should be softened by wax solvents



6. Foreign Body in Ear

C/F: Intense irritation, tinnitus, earache and diminished hearing.

Types:

- **Living FB:** insects, flies, maggots or cockroaches

Treatment: first killed by putting some oily drops and removed by forceps or syringing.

- **Non-Living FB:** organic, i.e. seeds, peas or beans and inorganic, i.e. beads, buttons, rubber.

Treatment:

1. Non impacted: Removed under general anesthesia by
 - Hygrophilic: Fine crocodile forceps or Ring curette
 - Non-Hygrophilic: Forceps, Ring curette or Syringing
2. Impacted: removed under general anesthesia by endaural or postaural route.



7. Otitis Externa

Localized Otitis Externa (Furuncle)

Description: Photograph of External auditory canal show localized inflamed swelling in roof of EAC.

Causative Organism: Staph. aureus

C/F:

- Severe pain and tenderness
- Movements of the pinna are painful
- Periauricular lymph nodes

Treatment:

- 1) Systemic antibiotics, analgesics and local heat.
- 2) An ear pack of 10% ichthammol glycerine provides splintage and reduces pain.
- 3) Incision and drainage if abscess has formed.



Diffuse Otitis Externa

Description: Photograph of External auditory canal show diffuse edema of EAC and slit like meatus, discharge.

Cause:

- 1) Trauma to the meatal skin
- 2) Invasion by pathogenic organisms
- 3) Secondary to infection of the middle ear or foreign body.
- 4) Allergic sensitization to the topical ear drops used for chronic suppurative otitis media.

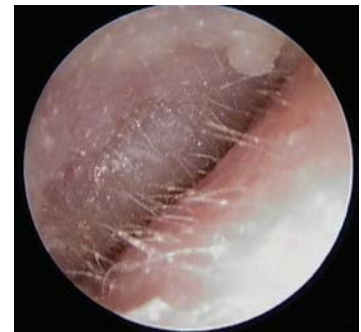
Causative Organism: Staphylococcus aureus, Pseudomonas, mixed.

C/F:

- Pain which is aggravated by movements of jaw.
- Ear starts oozing thin serous discharge which later becomes thick and purulent.
- Meatal lining becomes inflamed and swollen.
- Conductive hearing loss.
- In severe cases, regional lymph nodes become enlarged and tender
- Irritation and strong desire to itch (in chronic type).

Treatment:

- 1) **Aural toilets** (main stay of treatment) by dry mopping, suction clearance or irrigating the canal with warm, sterile normal saline.
- 2) **Medicated wicks:** a gauze wick soaked in antibiotic steroid preparation is inserted in the ear canal, advised to keep it moist by instilling the same drops twice or thrice a day, changed daily for 2–3 days when it can be substituted by ear drops.
- 3) **Antibiotics** according to type of micro-organism, and the main causative micro-organism in diffuse type is gram –ve. **a)** Topical antibiotics with steroids. **b)** Sometimes systemic antibiotics
- 4) **Analgesics.**



Malignant (Necrotizing) Otitis Externa

Description: Photograph of External auditory canal show diffuse inflamed skin of EAC with granulation formation, purulent discharge.

Causative Organism: *Pseudomonas*.

Risk factors:

- 1) The elderly diabetics
- 2) Pt on Immunosuppressive drugs.

C/F:

- Early resemble diffuse otitis externa
- Excruciating pain
- *Facial paralysis* is common
- *Appearance of granulations* in the ear canal.
- CT scan may show bony destruction

Treatment:

- 1) Control of diabetes.
- 2) Toilet of ear canal.
- 3) Antibiotic treatment for 6–8 weeks:
 - a) Gentamicin combined with ticarcillin IV.
 - b) Ceftriaxone usually combined with an aminoglycoside.
 - c) Quinolones (ciprofloxacin, ofloxacin and levofloxacin)



8. Otomycosis

Description: Photograph of External auditory canal show black dots/White paper like debris.

Causative organism: *Aspergillus (niger or fumigatus)* 80% or *Candida albicans* 20%.

C/F:

⇒ **Symptoms**

- Intense itching, pain
- Watery discharge with a musty odour and ear blockage.

⇒ **Signs**

- **A. niger** appears as blackheaded/dots filamentous growth
- **A. fumigatus** as pale blue or green dot
- **Candida** as white or creamy deposit

Treatment:

- 1) Aural toilet: suction clearance, drying
- 2) Topical antifungal medication; cream
- 3) Topical steroid and antibiotic for secondary bacterial infection



9. Tympanic Membrane Trauma

Description: Otoscopic Photograph of Rt ear show posterior upper TM perforation slit shaped, irregular with red margin and congestion of surrounding TM.

Causes:

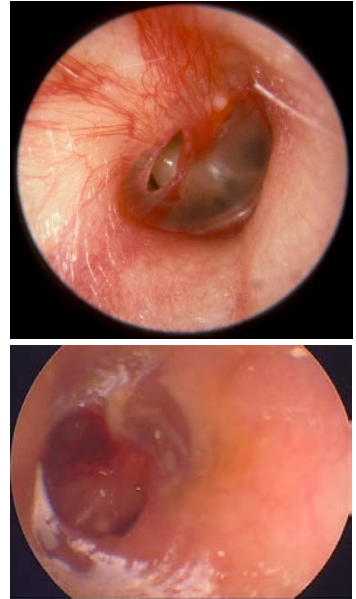
- 1) Trauma
- 2) Sudden change in air pressure, e.g. a slap or a kiss on the ear
- 3) Pressure by a fluid column, e.g. diving, water sports or forceful syringing.
- 4) Fracture of temporal bone.

C/F:

- Otagia
- Hearing loss
- Tinnitus and/or dizziness (if there is involvement of the ossicular chain).

Treatment:

- 1) Observation, water precautions and follow up: 90% will heal spontaneously.
- 2) Myringoplasty After three months if the TM doesn't heal.
- 3) Prophylactic antibiotics



10. Temporal Bone Fractures

Longitudinal Temporal Bone Fracture

MOA: Trauma to the side of the head

Fracture line Starts at squamous part of temporal bone to end at petrous apex.

C/F:

- Bleeding from ear **Common**, due to injury to tegmen and tympanic membrane
- Cerebrospinal fluid otorrhoea **Present**, often mixed with blood
- Hearing loss **Conductive**
- Facial paralysis **less (20%), delayed onset.**



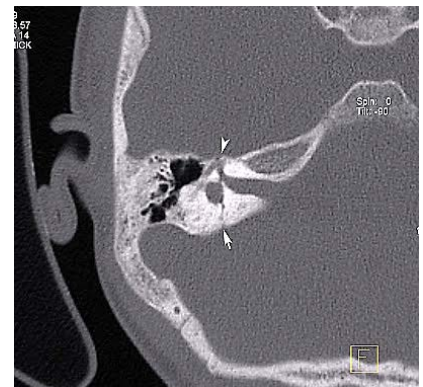
Transverse Temporal Bone Fracture

MOA: Trauma to the occipital area

Starts at foramen magnum or jugular foramen towards the foramen spinosum

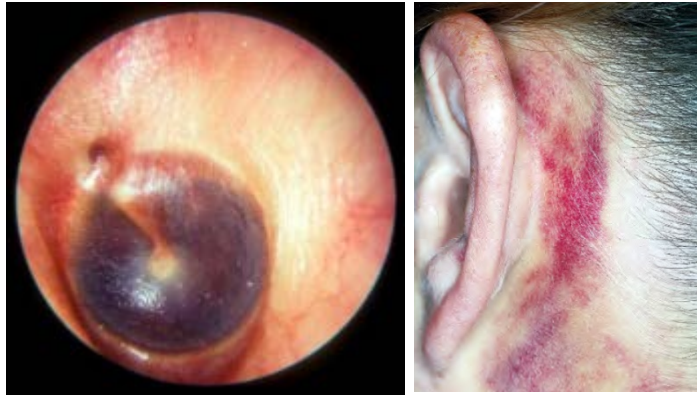
C/F:

- **Haemotympanum** may be seen
- Vertigo **Severe**, due to injury to labyrinth or CN VIII
- Hearing loss **Sensorineural**
- Facial paralysis **Most common (50%). Immediate onset.**



General C/F:

- **Local hematoma** in external auditory canal
- Bruising or ecchymosis behind the ear (**battle sign**) or around the eyes (**raccoon eye**).
- **Hemotympanum**: accumulation of blood behind the TM.

**Treatment:****a) Emergency**

- **Management of other associated injuries** (general resuscitation)
- **Neurological evaluation:** Facial nerve assessment

b) Evaluation

- **Hearing assessment**
- **CT scan** of the skull (brain) and temporal bone
- **B2-transferrin test:** If we are suspicious about CSF leak

c) Rx

- **CSF otorrhea:**
 - Prophylactic antibiotics
 - Persistent leak more than 14 days -> surgical intervention
- **Facial nerve paralysis:** immediate and total facial nerve paralysis -> surgical intervention
- **Hemotympanum:**
 - Prophylactic antibiotics
 - Myringotomy or Grommet tube may be needed for patients with persistent effusion

11. Acute Otitis Media (AOM)

Causes:

1. Through Eustachian tube opening:
 - **Nose:**
 - Influenza/common cold.
 - Coryza of measles, scarlet fever, whooping cough.
 - DNS and polypi.
 - **Sinuses:** Sinusitis
 - **Pharynx:** Acute tonsillitis/adenoiditis, cleft palate.
2. Ruptured TM:
 - Trauma to the tympanic membrane (TM).
 - Barotrauma; diving.
 - Temporal bone fracture.

C/F:

- Symptoms
 - **Severe otalgia**, Hearing impairment and Sometimes otorrhea and +/- tinnitus
 - Fever, irritability, abdominal pain, vomiting
- Signs:
 - **Bulging immobile**, opaque tympanic membrane with some degree of erythema
 - Purulent otorrhea

Treatment:

- 1) Analgesia to control the pain
- 2) Broad spectrum antibiotics: Penicillin or cephalosporin

Complications:

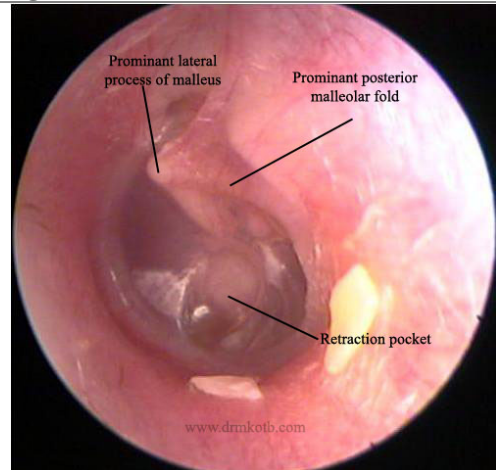
- 1) **Retracted TM:**
 1. Atelectasis and adhesive otitis media
 2. Ossicular erosion
 3. Tympanosclerosis
 4. Cholesteatoma formation
 5. Conductive hearing loss due to ossicular erosion or fixation
 6. Otitis media with effusion
- 2) **TM perforation:** CSOM
- 3) **Spread of infection**
 1. Acute Mastoiditis
 2. Petrous Apicitis
 3. Labyrinthitis and Sensorineural hearing loss
 4. Facial Paralysis
 5. Intracranial complications: Meningitis, Epidural abscess, Sigmoid sinus thrombosis, Brain abscess, Subdural abscess, Otitic hydrocephalus.

Acute Otitis Media stages

Tubal Catarrh/congestion

Retracted TM

- Absent cone of light
- Malleolar folds prominent
- Handle of malleus drawn backwards
- Lateral process of malleus looks prominent
- Mobility of drum is restricted.



Exudation

Marked congestion

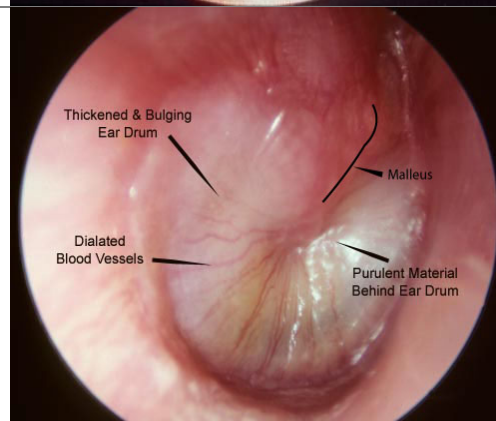
- Along the handle of malleus and periphery giving a cart wheel appearance
- Fullness of posterior part of drum.



Suppuration

The TM is red and bulging

- May show a yellow spot of future perforation



Resolution (Acute Suppurative OM)

TM perforation

- Discharge is seen coming through the perforation of the TM which is usually in its anteroinferior part.



12. Otitis Media With Effusion (OME) (Glue Ear)

Causes:

- 1) **Eustachian tube dysfunction (most common)**
 1. **Nose:** Chronic rhinitis and sinusitis, Nasal polyps, Allergic rhinitis, Viral infections
 2. **Nasopharynx:** Adenoid hyperplasia, Benign and malignant tumours of the NP, Palatal defects.
 3. **Oropharynx:** Chronic tonsillitis,
- 2) **Unresolved otitis media**
- 3) **Gastro esophageal reflux disease**
- 4) **Barotrauma to the ear** as those living in high altitude and the divers
- 5) **Mastoid pneumatization (poor pneumatize mastoid bone)**

C/F:

- Symptoms
 - Conductive Hearing loss, Mild earaches, Delayed speech, learning difficulty and bad performance at school.
- Signs:
 - Retracted tympanic membrane, dull and opaque with loss of light reflex
 - Yellow, grey or bluish in colour (**amber yellow**)
 - Air bubble or hairlines

Treatment:

- A. Medical:** Topical decongestants, Antiallergic therapy, Antibiotics and repeatedly perform Valsalva manoeuvre. Antioxidant; for 3 months and there's good response.
- B. Surgical treatment:** when fluid is thick and medical treatment alone does not help: Myringotomy and aspiration of fluid, Grommet insertion (persists for 1 and even for 2 years) and surgical treatment of the causative factors: like Adenoidectomy, tonsillectomy, and /or antral-washout.

Complications:

1. Retracted TM:
 - 1) Atrophic TM and atelactasis of the middle ear.
 - 2) Tympanosclerosis
 - 3) Ossicular necrosis
2. Retraction pockets and cholesteatoma formation
3. Cholesterol granuloma formation



Normal Tympanic Membrane
Pale gray semitransparent ovoid cone shaped disc



OME
Yellow, grey in colour (**amber yellow**) opaque, retracted TM



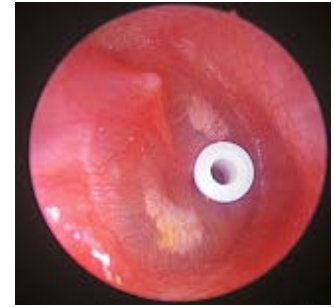
OME
Air bubbles in fluid

Maringotomy with Grommet insertion

Definition: tubes placed in the tympanic membrane to ventilate the middle ear space.

Indications:

1. If the glue does not resolve over 3 months, and if it is symptomatic.
2. Recurrent acute otitis media.
3. Significant tympanic membrane retraction.
4. Menière's disease.



Complications:

1. Recurrent ear infections
2. Persistent perforation (1–2%)

13. Chronic Suppurative Otitis media

Tubotympanic or safe type

Description: An inferiorly placed central safe perforation with marked tympanosclerosis of the drum.

Cause:

- 1) Sequela of *acute otitis media*
- 2) Ascending infections via the eustachian tube
- 3) Persistent mucoid otorrhoea



C/F:

- **Symptoms:**
 - **Ear discharge:** **nonoffensive**, mucoid or mucopurulent
 - **Hearing loss:** conductive type
- **Signs:**
 - **TM Perforation;** Always **central** type
 - **Middle ear mucosa** red, oedematous and swollen.
 - Occasionally, a **polyp** may be seen (a smooth mass of oedematous and inflamed mucosa which has protruded through a perforation and presents in the external canal).



Atticoantral or Unsafe type

Description: A superiorly based unsafe attico-antral perforation that is highly likely to be associated with cholesteatoma.

Cause: cholesteatoma

C/F:

- **Symptoms:**
 - **Ear discharge:** Usually scanty, but always **foul-smelling**
 - **Hearing loss:** conductive type
 - **Bleeding**



- Signs:
 - **TM Perforation;** either **attic** or **posterosuperior marginal** type
 - **Retraction pocket;** an invagination of tympanic membrane is seen in the attic or posterosuperior area of pars tensa.
 - **Granulation tissue**
 - **Cholesteatoma;** Pearly-white flakes of cholesteatoma



Attic perforation

Debris adherent to the pars flaccida of the drum



Cholesteatoma



Granulation tissue

A fleshy red polypus granulation mass filling the meatus

Treatment of CSOM:

A. Medical treatment:

- 1) Aural cleaning (cleaning of the external auditory canal and the middle ear under microscope) with suction
- 2) Topical antibiotics
- 3) Short course of systemic antibiotics (quinolone)

B. Surgery:

- 1) Tympanoplasty: is surgical procedure to repair tympanic membrane and reconstruct the ossicles
- 2) Myringoplasty: surgical repair for TM only
- 3) Mastoidectomy: surgical procedure to remove mastoid air cell.

14. Acute Mastoiditis

Description:

Cause: Usually accompanies or follows acute suppurative otitis media

C/F:

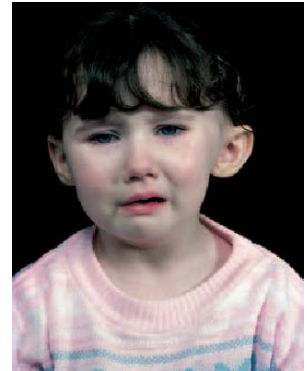
- **Symptoms:** Pain behind the ear, persistence or recurrence of fever, persistence of discharge beyond 3 weeks.
- **Signs:**
 - Swelling on the mastoid with tenderness and accentuation of postauricular sulcus
 - Ear discharge is of pulsatile in nature
 - Ill, toxic Patient and pulse rate is increased.
- **CT scan the mastoid air cells** appear cloudy or opacity of mastoid air cells.

Treatment:

- 1) Hospitalization
- 2) IV Antibiotics
- 3) Myringotomy
- 4) Cortical mastoidectomy when there is subperiosteal abscess.

Complications:

- Subperiosteal abscess: types
- Fistula



15. Facial Nerve Palsy

Ramsay Hunt syndrome

Description:

Cause: varicella zoster virus

C/F:

- Facial paralysis
- Severe pain and vesicular rash in external auditory canal and pinna.
- Anaesthesia of face, giddiness and hearing impairment

Treatment: General measures, steroids, acyclovir



Bell's palsy

Description:

C/F:

- **Sudden onset paralysis:** Patient is unable to close his eye. On attempting to close the eye, eyeball turns up and out (Bell phenomenon).
- **Saliva dribbles** from the angle of mouth and **Epiphoria**
- **Pain in the ear** is variable
- **Hyperacusis** or **loss of taste**

Treatment:

A. General measures:

- 2) Relief of ear pain by analgesics.
- 3) Care of the eye by use of artificial tears (methylcellulose drops) every 1–2 h.
- 4) Physiotherapy or massage of the facial muscles

B. Medical Treatment: no specific Rx. to prevent denervation or promote regeneration

- 1) Prednisolone
- 2) Vasodilatation therapy: Nicotinic acid, Stellate ganglion, histamine

C. Surgical Treatment: Surgical decompression



16. Tympanosclerosis

Description: a white plaque in the TM

Causes:

1. Otitis media (long term)
2. Tympanostomy
3. Atherosclerosis

Treatment:

1. Surgical removal of sclerosed area
2. Hearing Aid



Common cases of the Nose

1. Foreign body in nose

Description:

Clinical Features:

- Unilateral nasal obstruction
- Unilateral discharge usually *foul smell* is characteristic symptom.
- Bleed may occur



Treatment: Removal using crocodile forceps, hook or suction.

Complications:

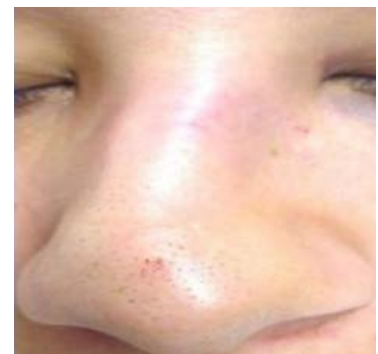
1. Nasal infection and sinusitis.
2. Rhinolith formation.
3. inhalation into the tracheobronchial tree

2. Nasal Bone Fracture

Description: Photograph of the external nose show lateral deviations of the nose with site of redness indicate nasal trauma

Clinical Features

- **Signs:**
 - Deformity: lat. displacement.
 - External swelling may obscure the deformity
 - Black eye, common (periorbital & subconj).
- **Symptoms:**
 - Pain, Epistaxis and Nasal obstruction due to dislocation or hematoma of the septum.



Diagnosis: Clinical and radiological by Nasal X ray (to confirm the diagnosis and for medico legal aspect)

Treatment:

1. Manage the epistaxis
2. Treatment of deformity
 - The patient is seen early before swelling appear: *reduce immediately* under GA either manually or by instrument (Walsham's forceps for nasal bone and Asch's forceps for septum).
 - When the swelling is marked & the landmarks lost:
 - Wait one week until the swelling disappear.
 - Reduction under the local or G/ A.
 - After 2 weeks (Mal-union) require rhinoplasty.
3. Anterior nasal packing to support nasal bones from inside for 2 days
4. Fixation of bones by plaster of paris for 2 weeks
5. antibiotics, analgesia



Complications: Abscess, Hematoma, Cavernous sinus thrombosis

3. Septal Hematoma

Description: Photograph of the nostrils lifted by thumb show bilateral bulging mass red homogenous in color from the septum and small wound in upper lip most likely septal hematoma due to trauma.

Causes: Trauma

Clinical Feature: Nasal obstruction is usually bilateral

Treatment:

1. Incision & drainage
2. Nasal packing to prevent further oozing
3. Systemic antibiotic to prevent secondary infection

Complications:

1. Septal abscess & cartilage necrosis and ext. deformity result.
2. Permanent thickening of the septum by fibrosis



4. Septal Abscess

Causes:

- Secondary to hematoma
- It's may complicate nasal furunculosis

Clinical Features

- Septal swelling (bilateral)
- Pain, fever, nasal obstruction

Treatment: Incision, drainage, antibiotics

5. Nasal Septal Deviation

Description: Photograph of the nostrils lifted by thumb show septum deviation to the left.

Causes:

- Trauma
- Compression during birth

Clinical Features

1. Nasal obstruction
2. External deformity in some cases.
3. Pressure headache
4. Nose bleeding (sometimes)

Treatment:

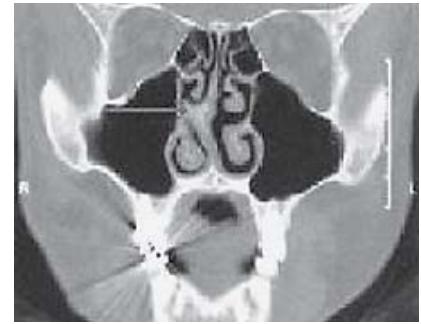
1. Sub mucous resection of septum
2. Septoplasty ± Rhinoplasty

Complications of septoplasty:

- Damage to adjacent structures including cribriform plate
- CSF rhinorrhea
- Failure to correct the defect
- Epistaxis
- septal hematoma



Computed tomography scan showing gross deviation of the posterior septum, known as a septal spur.



6. Nasal Septal Perforation

Description:

Causes: Septal hematoma, Abscess.

Clinical Features

1. Epistaxis
2. Nasal obstruction
3. Whistling in inspiration

Treatment:

1. Nasal douching with saline or bicarbonate solution
2. Antiseptic cream will control infection.
3. If crusting and bleeding remain a perforation closed by silastic double-flanged button.



7. Saddle Nose deformity

Description:

Causes:

1. Trauma (most common)
2. Congenital syphilis
3. Polychondritis
4. Cocaine Abuse
5. Leprosy

Treatment: Surgery (Rhinoplasty)



8. Vestibulitis

Description: Photograph of the nostrils show scaly dermatitis of skin of the vestibule

Causes:

- Irritation, maceration produced by rhinorrhoea.
- Trauma & picking with finger

Clinical Features

- Induration (diffuse redness)
- Excoriation & painful fissures affect the vestibule

Treatment:

- Treat the cause of discharge
- Topical antibiotic as (chlorhexidin)



9. Nasal Furunculosis

Description: Photograph of the nostrils show small red swelling in vestibule

Causes: Acute staphylococcal infection of a hair follicle or sebaceous gland in the vestibule.

Clinical Features Pain, indurated swelling in the vestibule & usually at the tip of the nose

Treatment: Systemic antibiotic, drainage on need (if there is pus)

Complications: Cavernous Sinus thrombosis, Cellulites of the upper lip.



10. Rhinitis

Acute Rhinitis (Common cold)

Clinical Features:

- Sneezing, discharge from the nose and nasal obstruction.
- Mucous membrane of nose and throat is swollen and congested.
- Fever appears due to toxemia.
- On 2nd or 3rd day, there is thick discharge
- On 5th day onwards, symptoms start decreasing and recovery occurs.

Treatment: (Conservative treatment only as it self-limited last with/without Rx one week)

1. Complete bed rest
2. Antibiotics to prevent complications and secondary infection
3. Antihistaminics and anti-inflammatory drugs are given symptomatically 2 to 3 times a day
4. Avoidance of dusty and crowded places
5. Smoking and hard drinks are avoided.

Complications: nasopharyngitis, sinusitis, eustachian tube (ET) catarrh, otitis media, lymphadenitis, respiratory tract infection, tonsillitis, nephritis and rheumatism.

Allergic Rhinitis

Causes: an IgE mediated reaction to one or more allergens

Clinical Features:

- Seasonal AR: sneezing, watery rhinorrhea, itching of the nose, eyes, and nasal congestion.
- Perennial AR: nasal congestion, blockage, and post-nasal drip.
- The nasal mucosa: moist, pale and swollen and the turbinate hypertrophied

Treatment:

1. Allergens avoidance and environmental control
2. Oral anti-histamine: Desloratidine , fexofenadine
3. Decongestant
4. Intra-nasal sodium nasal cromoglicate
5. Leukotrienes inhibitors

Atrophic Rhinitis

Causes:

- Unknown
- **Etiological Factors:** Chronic sinusitis, chronic granulomatous lesion such as tuberculosis, syphilis, and leprosy, Excessive destruction of nasal tissue caused by surgery (Turbinectomy) and Irradiation.

Clinical Features:

- **Symptoms:** Nasal obstruction (in spite of roomy nose), epistaxis on removal of crusts, Headache, Excessive crusting of nose – brown black green in colour and anosmia.
- **Signs:** Greenish-black crust and thick purulent discharge in the nose, Presence of fetor and Nasal passages are roomy.

Treatment:

1. Conservative treatment:
 - Saline or alkaline douching
 - Glucose 25% in glycerin drops prevent adherent of fresh crust and inhibit infection.
 - Local or systemic antibiotics as fluoroquinolones and metronidazole
2. Surgical treatment: severe cases may require a YOUNG procedure

11. Acute Sinusitis

Description: Inflamed nasal mucosa with mucopus

Causes:

1. Majority follow a viral upper respiratory tract infection
2. FB in nose, nasal packing
3. Dental caries or oro-antral fistula.
4. Fracture maxilla

Clinical Features

- **Symptoms:** Malaise, fever and headache. Nasal congestion/ blockage. Mucopurulent rhinorrhea and Facial pain (Over the infected sinus, Worse on bending forward, coughing and straining, more severe in the morning).
- **Signs:**
 - ⇒ Inflamed nasal mucosa +/- mucopus in:
 - Middle meatus: sinusitis of anterior group
 - Superior meatus: sinusitis of posterior ethmoid
 - Sphenoethmoidal recess: sphenoidal sinusitis
 - ⇒ Mucopus may stream back into the post nasal space



Treatment:

1. Bed rest and adequate simple analgesia (e.g.: paracetamol)
2. Broad spectrum antibiotics (co-amoxyclav, clarithromycin or cefuroxime)
3. Decongestant (pseudoephedrine or xylometazoline)
4. Steam inhalation
5. Surgery: antral puncture and lavage (Antral washout) or Functional Endoscopic Sinus surgery (FESS) for Resistance and complicated cases.

Complications:

1. Orbital complications
 - 1) Pre-septal cellulitis (orbital edema)
 - 2) Orbital cellulitis
 - 3) Subperiosteal abscess
 - 4) Orbital abscess
 - 5) Cavernous sinus thrombophlebitis
2. Osteomyelitis of maxilla or frontal bone
3. Intracranial complication
 - 1) Meningitis
 - 2) Extra-dural abscess
 - 3) Subdural abscess
 - 4) Intra-cerebral abscess
 - 5) Cavernous sinus thrombosis
4. Mucocele
5. Locoregional (descending) complications: Pharyngitis, Laryngitis and Otitis media.

12. Orbital Cellulitis

Causes: one of ethmoid sinus infection complication

Clinical Features

- Diffuse orbital edema
- Impaired extra ocular muscles, normal vision.

Treatment:

- 1) Hospital admission
- 2) IV Antibiotics
- 3) Surgical drainage if there subperiosteal abscess



13. Frontal Osteomyelitis

C/F:

- Dull local pain with oedema of the forehead and upper eyelids.
- Tender fluctuant swelling of the forehead

Causative agent: Staph. aureus

Diagnosis: Needle aspiration, CT scan and MRI

Treatment:

1. Intravenous antibiotics
2. Surgical drainage of the frontal sinus and appropriate debridement

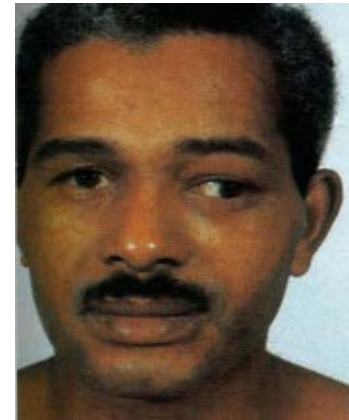
14. Mucocele

Definition: an epithelial-lined mucous-containing sac completely filling the sinus and capable of expansion. The cyst gradually expands and exerts pressure on the sinus wall causing erosion.

C/F: Proptosis, Swelling

- Above medial half of the eye in frontal mucocele
- Medial to the eye in ethmoidal mucocele.

Treatment: surgical evacuation and drainage of sinus by external or endoscopic approach



CT scan of mucocele of the left frontoethmoid region. Note the left eyeball has been displaced downwards and laterally (arrows)



15. Nasal Polyp

Definition: gray translucent appearance mucosa prolapsing into the nasal cavity.

Types:

1. Ethmoidal polypi: are usually multiple, bilateral
2. Antrochoanal polypi: are usually unilateral, single

Causes:

1. Allergy: causing edema of the mucosa leading to poor ventilation and drainage of secretions.
2. Mucoviscidosis or cystic fibrosis or any condition resulting in the derangement of nasal mucous membrane.
3. Samter triad → Asthma, aspirin sensitivity and polypi
4. Kartagener syndrome—sinusitis, bronchiectasis, situs inversus and ciliary dyskinesia
5. Young's syndrome, nasal polypi, bronchiectasis, sinusitis and azoospermia
6. Chronic sinus infection is thought to be the cause of antrochoanal polypi



Clinical Features

- **Symptoms:**
 - Nasal obstruction (unilateral or bilateral)
 - Anosmia and loss of taste
 - Rhinorrhea may be watery or mucopurulent and post nasal drip.
 - Frontal headache, snoring and change of voice (hyponasality).
 - Broadening of nose causing frog face deformity.
- **Signs:**
 - *Anterior rhinoscopy:* Smooth, glossy, multiple, mobile, bluish gray masses like a bunch of grapes. On probing, a polypus is soft, insensitive and movable, not fragile, does not bleed on touch and is nontender.
 - *Posterior rhinoscopy:* a smooth, greyish white, spherical mass in the choana and may be seen projecting below the soft palate



DDX:

- 1) Nasal polyp
- 2) Tumor: Squamous or transitional cell papilloma.
- 3) Hypertrophy of inferior turbinate
- 4) Meningocele/meningoencephalocele.

Treatment:

- 1) Intra nasal corticosteroids
- 2) Systemic corticosteroids
- 3) Antibiotics
- 4) Surgery (polypectomy)

17. Epistaxis

Causes:

Local	Systemic Disorders
Trauma	Hypertension
Infection (e.g., upper respiratory tract infection (URTI), acute sinusitis)	Drugs (e.g., aspirin, warfarin)
Foreign body	Haematological disorders: Myelomas Leukaemia Haemophilia Hepatic disorders
Chemical irritants	Genetic conditions (e.g., hereditary haemorrhagic telangiectasia (HHT))
Neoplastic disorders Benign/malignant neoplasm Juvenile angiofibroma	



Initial Management:

- Airway – If compromised, assess the oropharynx and suction any clots.
- Breathing
- Circulation

- Ensure wide-bore intravenous access and **send blood for** a full blood count and group and coagulation profile.
- Check heart rate and blood pressure and resuscitate with fluids and/or blood as required.
- Instigate simple first aid measures with firm compression of both nostrils for 5 min, head tilted forward, and apply ice to the back of the patient's neck or sucking ice cubes.

History:

1. Bleeding onset, duration, side (may often start on one side then appear to become bilateral due to overflow), whether anterior (running out of the nose) or posterior (swallowing blood), or both.
2. Previous episodes and any treatment given
3. Precipitating factors including recent trauma or surgery.
4. Past medical history; hypertension, coagulopathies and HHT.
5. Relevant drugs include antihypertensives, aspirin, warfarin and heparin.

Examination:

- Anterior rhinoscopy; inspection of the anterior septum and in particular Little's area,
- If no obvious bleeding point is seen and the situation permits, complete the examination using a rigid Hopkins rod endoscope to evaluate the nasal cavities and postnasal space.

Definitive treatment:

Stopping the bleeding:

1. **Local Cautery:** Chemical with silver nitrate cautery stick or electrocautery.
2. **Anterior nasal packing:** in cases of active anterior epistaxis and bleeding is profuse and/or the site of bleeding is difficult to localize. Packed for 24 to 48 hours by one of following (liquid paraffin ribbon gauze, Bismuth iodoform paraffin paste gauze (BIPP), Merocel pack, Vaseline gauze or Simpson Balloon). Systemic antibiotics should be given to prevent otitis media, and rhinosinusitis.
3. **Posterior nasal packing:** If bleeding does not stop by anterior nasal packing. Packing by gauze, Foley's catheter (12 – 14F) or Brighton nasal balloon inflated with air.
4. **Ligation**
 - 1) **Sphenopalatine Artery ligation**
 - 2) **Anterior ethmoid artery clipping:** It is required for uncontrolled bleeding from the upper part of the nose, above middle turbinate.
 - 3) **Maxillary artery ligation, clipping.**
 - 4) **External carotid artery ligation**
5. **Embolization:** with gel sponge or beads sometimes associated with complications (0.1%) like CVA.
6. **Septoplasty (SMR)** may be required if there is significant deviation or a large septal spur; this may have prevented adequate packing initially.

Treatment of the cause

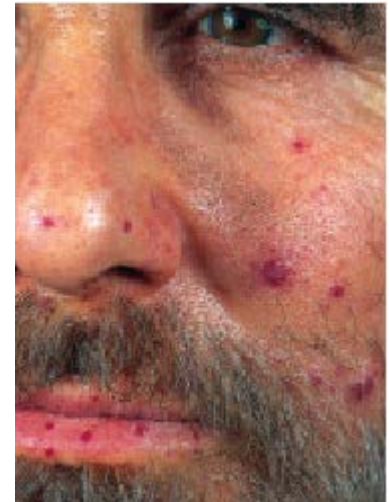
Familiar hemorrhagic telangiectasia

Cause: familial autosomal dominant disorder

C/F: red spots on the lips and mucous membranes of the mouth especially the tongue as well as the face and in the nose.

Treatment:

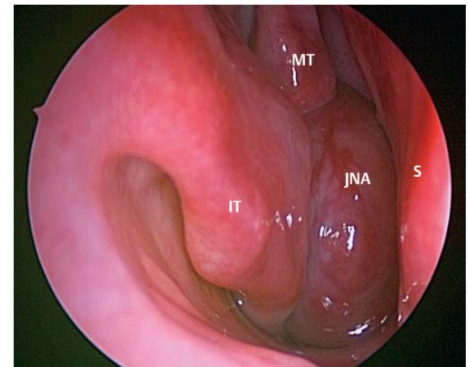
- 1- Estrogens therapy.
- 2- Radiotherapy.
- 3- Diathermy, laser (argon, KTP, YAG)
- 4- Septal dermoplasty.
- 5- Microembolization.
- 6- Young's operation.



Juvenile Angiofibroma

Clinical Features:

- **Adolescent males** (testosterone dependant tumour)
- **Symptoms:**
 - **Profuse and recurrent epistaxis**
 - Progressive unilateral nasal obstruction
 - Otagia, OME, Proptosis, Diplopia, headache
- **Signs:**
 - **Pink or purple mass** obstructing one or both choana
 - Swelling of the cheek (in advanced lesions)
 - Frog face

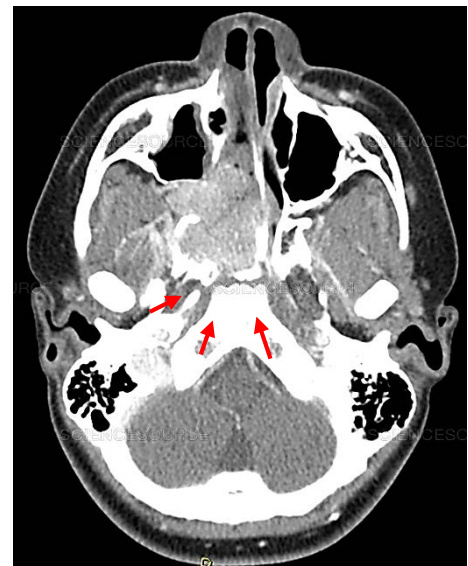


Diagnosis:

1. **CT – scan with contrast:** show extent of the tumour, bony destruction and anterior bowing of posterior wall of maxillary sinus (Antral sign or Halman muller sign).
2. **MRI, Carotid angiography**

Treatment: Surgical excision

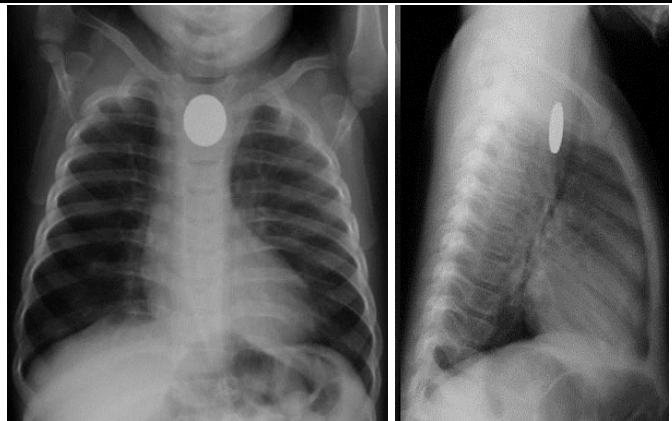
- **Pre-op:** embolization, estrogen, radiotherapy
- **Op:** surgical excision
- **Post-op [recurrent]:** chemotherapy, radiotherapy



Common cases of the Pharynx

1. Foreign Bodies in Hypopharynx/Esophagus

Description: Chest X-ray PA and lateral views showing homogenous dense round opacity most likely foreign body (coin) has lodged at one of anatomical narrowings in the oesophagus, i.e. the arch of the aorta.



Types of Foreign bodies: ranging from meat or fish bones, soft food bolus to batteries and coins

Common sites of lodgment:

- **Hypopharynx:** the pyriform fossae and post-cricoid region.
- **Esophagus:** Cricopharyngeus, Arch of aorta, Tracheal bifurcation and Gastro-oesophageal junction.

C/E:

- **Hypopharynx:**
 - A foreign body sensation, pain, dysphagia or drooling.
 - sense of a blockage in the throat
 - Point tenderness in the neck
 - Dyspnea with or without hoarseness if the object is lodged close to the larynx
 - Presence of air in the upper oesophagus or soft-tissue swelling of the posterior pharyngeal wall on plain x-ray are suggestive features.
- **Esophagus:**
 - Dysphasia and Retrosternal or back pain
 - Drooling or regurgitation of food

Diagnosis:

- Flexible endoscopy
- Soft tissue neck film or chest film (anterior posterior (AP) and lateral [lateral for localization according to vertebral body]).

Treatment: Endoscopic removal under general anaesthesia is often required

Complications:

- 1) Para-oesophageal abscess
- 2) Mediastinitis
- 3) Empyema
- 4) Airway obstruction
- 5) Tracheo-oesophageal fistula
- 6) Late stricture formation

2. Acute Pharyngitis

Description: Photograph of the oropharynx show diffuse redness and inflamed mucosa of the pharynx with mucopus and follicular aggregations in posterior wall. Mild tonsillar enlargement.



Causes:

1. **Simple acute pharyngitis:** cold air, irritation from fumes, smoky atmosphere or postnasal drip, gastro-oesophageal reflux.
2. **Infective pharyngitis:** Streptococcus (Group A, beta-haemolyticus), viral infection.

Clinical Features

- **Symptoms:**
 - Sore throat, slight pain on swallowing in non-infective type.
 - Headache, malaise and high fever, severe odynophagia and LAP in infective type.
- **Signs:**
 - Erythema, exudate
 - Enlargement of tonsils and lymphoid follicles on the posterior pharyngeal wall.
 - **Very severe cases** show oedema of soft palate and uvula with enlargement of cervical nodes.

Treatment:

1. Remove the cause
2. Bed rest, plenty of fluids, warm saline gargles or paracetamol gargles.
3. Infective pharyngitis: mild cases: Symptomatic, if severe: Antibiotics in form of penicillin.

3. Chronic Pharyngitis

Description



Chronic catarrhal pharyngitis

Congestion of posterior pharyngeal wall with engorgement of vessels
Faucial pillars may be thickened
There is increased mucus secretion.



Chronic hypertrophic pharyngitis

Thick and oedematous with congested mucosa and dilated vessels.
Posterior pharyngeal wall may be studded with reddish nodules.

Causes:

1. **Persistent infection in the neighbourhood:** Chronic rhinitis, sinusitis, tonsillitis and dental sepsis.
2. **Chronic irritants:** Excessive smoking, GERD, post nasal drop
3. **Mouth breathing**
4. **Faulty voice production**
5. **Environmental pollution:** Smoky or dusty environment

Clinical Features: Sore throat, Discomfort or pain in the throat and foreign body sensation in throat.

Treatment:

1. Resolve the endogenous cause
2. Eliminating irritants in the atmosphere particularly stop the smoking
3. Symptomatic treatment

4. Infectious Mononucleosis

Description: Photograph of the oropharynx show red anterior pillar with left tonsillar enlargement with white membrane on it's surface.

Causative agent: Epstein Barr virus

Clinical Features

- **Symptoms** Severe sore throat associated with odynophagia, malaise and massive bilateral LAP (persist despite antibiotics treatment).
- **Signs:**
 - A white membrane covering one or both tonsils
 - May be associated with petechial hemorrhages

Treatment:

1. Bed rest, plenty of warm fluids
2. Dose of I.V. hydrocortisone If there is marked stenter
3. Antibiotics if secondary bacterial infection supervenes but amoxicillin should be avoided.



5. Candida infection of Pharynx

Description: Photograph of the oropharynx show white patches distributed on uvula and posterior pharyngeal wall, normal pink color mucosa.

- a. Extensive punctate white areas
- b. Extensive continuous white areas

Causes:

1. Seriously ill and debilitated patients.
2. Radiotherapy to the head and neck
3. Asthmatic patients taking steroid inhalers

Clinical Features

- **generally asymptomatic**, apart from **slight soreness and bleeding**
- White patches, easily scraped off the mucus membrane.

Treatment:

1. Stop antibiotics.
2. Topical nystatin.
3. If severe, systemic antifungal



6. Diphtheria

Causative agent: *Corynebacterium diphtheriae*.

Clinical Features

- Greyish membrane appears on the tonsils and pharyngeal wall.
- If severe; gross oedema of the pharynx and stertorous breathing
- Fever.

Treatment: Antitoxin, systemic penicillin



7. Adenoid

Description: Plain x-ray; lateral view of skull, non-labeled show enlarged adenoid shadow in posterosuperior wall of nasopharynx with narrowing of airway.

Clinical Features

- Bilateral Nasal Obstruction**
 1. Mouth breathing, Snoring and sleep apnea syndrome.
 2. Rhinorrhea and Stagnation of the secretion of the nose
 3. Acute and chronic sinusitis.
- Eustachian tube obstruction:**
 1. Conductive Hearing loss (deafness)
 2. Otitis media with effusion
 3. Suppurative Otitis media
- Adenoid facies:** Open dry mouth, Elevated upper lip, Prominent and crowded upper teeth, High arched palate, Retrognathic mandible, Pinched nose due to disuse atrophy of alae nasi, Shallow nasolabial fold, An elongated face, Dull expression, Drooling of saliva.



Treatment:

1. Decongested, saline or steroid nasal drops, Antihistamines, Antibiotics and Management of any associated nasal allergy.
2. Adenoidectomy – whenever it causes complication.



8. Tonsillitis

Acute Tonsillitis

Description:

Acute Tonsillitis Stage	
Acute follicular Pus points as yellowish spots are seen at the mouth of crypts.	
Acute parenchymatous Tonsil is uniformly enlarged, red and congested, contains whitish color pus.	
Acute membranous Exudation from the crypts coalesces to form a membrane on the surface of tonsil.	

Clinical Features

- Symptoms:
 2. Headache, general body aches, malaise and constipation.
 3. **Sore throat**, odynophagia and dysphagia, **Fever**
 4. **Referred otalgia**
 5. **Cervical pain** due to cervical lymphadenitis
- Signs:
 - Tender cervical lymphadenopathy especially submandibular and jugulodigastric.
 - Tonsils enlarged, hyperemic ± exudates/white follicles.
 - Often the breath is foetid and tongue is coated.
 - There is hyperaemia of pillars, soft palate and uvula.

DDX: Glandular fever, agranulocytosis, scarlet fever, acute leukaemia and diphtheria.

Treatment:

1. Bed rest, soft diet, and ample fluid intake, gargle with warm saline solution.
2. Analgesics and antipyretics.
3. Antibiotics (only after appropriate swab for C&S, 1st line penicillin or amoxicillin x 10 days).
4. Tonsillectomy.

Complications

1. **General:** Scarlet fever, Glomerulonephritis, Rheumatic fever, rheumatic heart disease, Sepsis.
2. **Local:** Chronic tonsillitis, Peritonsillar (Quinsy), intratonsillar Abscesses, parapharyngeal abscess and retropharyngeal abscess, Otitis media, laryngitis or bronchitis.

Tonsillectomy

Description: Following tonsillectomy, a membrane of slough that gradually separates over 10–14 days covers the post-tonsillectomy fossa. This appearance can be mistaken for an infection. No antibiotics are needed in this situation.



Indications of Tonsillectomy:

Absolute	Relative
- Chronic or recurrent tonsillitis - Seven episodes in 1 year, or - Five episodes per year for 2 years, or - Three episodes per year for 3 years, or - Two weeks or more of lost school or work in a year. - Peritonsillar abscess: - In children after 4–6 weeks - In adults after second attack. - Tonsillitis causing febrile convulsions. - Cardiac valvular disease associated with recurrent streptococcal tonsillitis. - Hypertrophy of tonsils causing: - Excessive snoring or sleep disturbances. - Obstructive sleep apnoea. - Cor pulmonale. - Dysphagia. - Interfere with speech. - Suspicion of malignancy–Asymmetric tonsillar hypertrophy.	- Peritonsillar abscess (quinsy) single attack. - Eating and swallowing disorders for longstanding period. - Halitosis - Tonsilolithiasis - Rheumatic fever and glomerulonephritis

Tonsilloliths

Causes: in chronic tonsillitis when its crypt is blocked with retention of debris.

C/F: local discomfort or foreign body sensation

Treatment: simple removal of the stone or tonsillectomy.



Tonsillar cyst

Causes: blockage of a tonsillar crypt

C/F: yellowish swelling over the tonsil, symptomless

Treatment: drainage.



Tonsillar carcinoma

Types:

- *Squamous cell carcinoma* is the most common and presents as an ulcerated lesion with necrotic base.
- *Lymphomas* may present as unilateral tonsillar enlargement with or without ulceration and may simulate indolent peritonsillar abscess.

Dx: Biopsy

Treatment: Tonsillectomy with radiotherapy



9. Peritonsillar Abscess (Quinsy)

Definition: a collection of pus in the peritonsillar space which lies between the superior constrictor laterally and capsule of the tonsil medially.

Clinical Features

- **Symptoms:** Odynophagia, a unilateral sore throat, with referred otalgia and trismus as well as malaise, fever.
- **Signs:**
 - Dribbling saliva, the affected side is congested and bulging and Tonsil is pushed downwards and medially.
 - The adjacent anterior pillar and soft palate can be inflamed and swollen, with the uvula pushed across the midline
 - Trismus



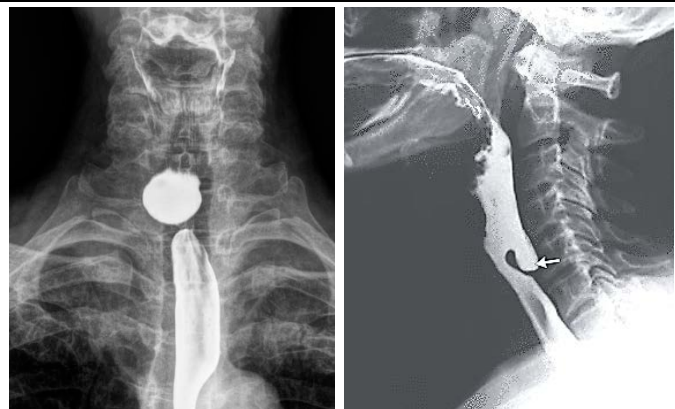
Treatment:

1. Incision and drainage of abscess
2. Broad spectrum antibiotics, such as ampicillin/amoxicillin
3. Anti-inflammatory drugs and analgesics such as brufen or nimesulide.

10. Pharyngeal Pouch (Zenker's Diverticulum)

Description: contrast enhanced X-ray film of neck, Lat. & AP views non labeled, show accumulation of the contrast in a pocket from hypopharynx at level of the 5th C. vertebra.

Cause: Herniation of the pharyngeal mucosa through a relatively unsupported part of the posterior pharyngeal wall known as Killian's dehiscence may be related to incoordination of the swallowing with cricopharyngeal spasm.

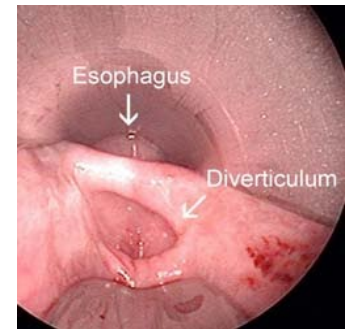


Clinical Features

- Lump in the throat, dysphagia, food regurgitation, halitosis
- Wt. loss
- Recurrent chest infections, and hoarseness.
- DX: barium swallow.

Treatment:

- Conservative
- Endoscopic dilatation, Endoscopic division.
- Diverticulectomy.



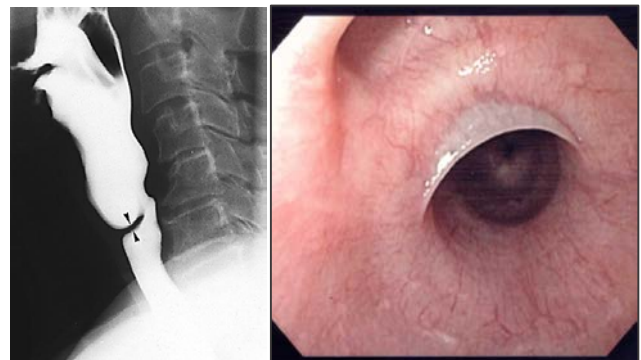
11. Plummer Vinson Syndrome

Clinical Features

- Iron Deficiency anemia; koilonychia, angular stomatitis and glossitis
- Dysphagia caused by **postcricoid web**.

Treatment:

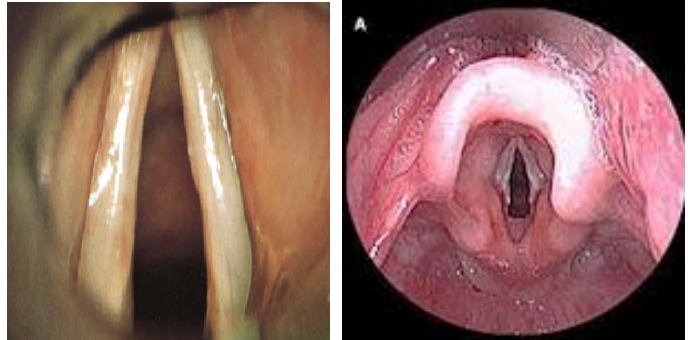
1. Correction of Hb
2. Follow up for life (risk of postcricoid carcinoma)



Common cases of the Larynx

1. Normal Larynx and Vocal Cord

Normal vocal cords. These are ivory-colored and smooth with few vessels on the surface.



2. Laryngeomalacia

Description: endoscopic photograph show elongated epiglottis, curled upon itself (omega-shaped Ω), floppy aryepiglottic folds and prominent arytenoids.

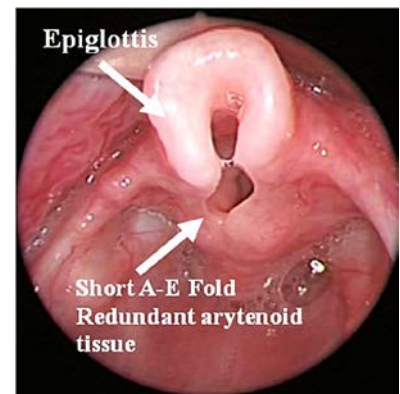
Clinical Features

1. **Inspiratory stridor**
 - Worse in supine position
 - Stridor may be exacerbated by crying
2. **Respiratory Distress:** Tachypnea, intercostal recession, subcostal recession.

Diagnosis: Flexible Nasolaryngoscope

Treatment:

1. Observation: Spontaneous improvement expected to be at the age of **18-24 months** of life.
2. Supraglottoplasty: in cases of Severe strider, Apneic episode, Failure to thrive and Develops pulmonary hypertension and co-pulmonalae.



3. Subglottic stenosis

Description: endoscopic photograph show narrowing of subglottic area.

Causes:

1. **Congenital** subglottic stenosis
2. **Acquired** subglottic stenosis (more common) due to Endotracheal intubation, Surgical trauma, Inflammation, External trauma, Thermal or chemical injuries.

Clinical Features: Dyspnoea and stridor (biphasic).

Treatment: Endoscopic treatment

- a) **Laser intervention;** in mild to moderate.
- b) **Anterior cricoid split**
- c) **Laryngotracheal reconstruction**
- d) **Cricotracheal resection:** resection of stenotic area with end to end anastomoses.



4. Congenital laryngeal web

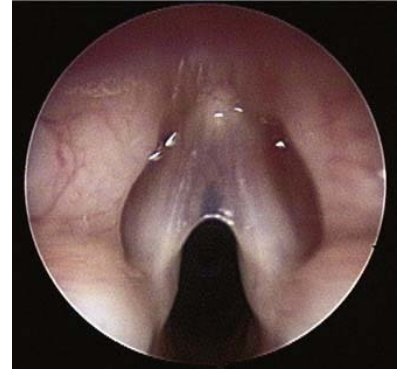
Description: endoscopic photograph show a membrane in the glottic area covering anterior half of laryngeal inlet.

Clinical Features

- Weak cry or aphonia dating from birth.
- Stridor
- Hoarseness of the voice

Treatment:

1. **Incision:** in case of simple small membrane
2. **Laryngeofissure approach:** in more severe case.



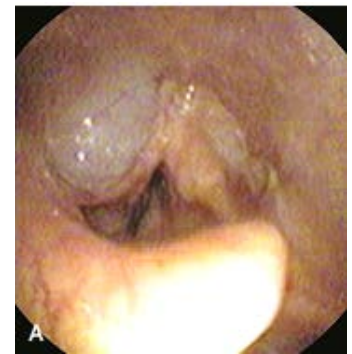
5. Laryngeal cyst

Description: endoscopic photograph show smooth swelling in right the aryepiglottic fold.

Causes: submucosal gland obstruction

Clinical Features stridor, breathing difficulties, cyanotic episodes.

Treatment: Endoscopic deroofing of the cyst



6. Subglottic hemangioma

Description: endoscopic photograph show subglottic reddish-blue swelling.

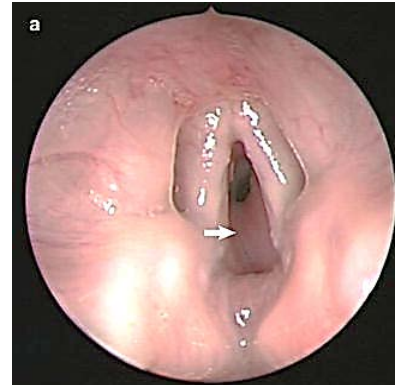
Causes: Congenital haemangioma

Clinical Features

- **Biphasic stridor** but has a normal cry
- Cutaneous haemangiomas in 50% of the children
- Airway obstruction; increase by agitation of the patient or crying due to venous filling.

Treatment:

1. Tracheostomy and observation
2. Systemic and intralesional steroid
3. CO₂ laser endolaryngeal laser tube
4. Open resection and interferon: Interferon usually uses in multiple haemangioma (laryngeal and other airway haemangioma, cutaneous haemangioma); If can't use steroid.

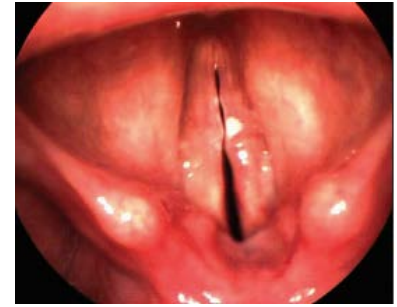


7. Acute Laryngitis

Description: Fibroptic endoscopic photograph show erythematous and edematous laryngeal mucosa, congested vocal cords.

Causes:

1. **Infectious type:** follows **upper respiratory infection**.
2. **Non-infectious type:** Vocal abuse, allergy, thermal or chemical burns to larynx and Laryngeal trauma such as endotracheal intubation.



Clinical Features

Symptoms: Hoarseness, Dysphonia, Dysphagia, pain on phonation and Dry, irritating cough, malaise and fever.

Signs

- **Early Stages:** erythema and oedema of epiglottis, aryepiglottic folds, arytenoids and ventricular bands, but the vocal cords appear white and near normal
- **Later:** hyperaemia and swelling increase. Vocal cords also become red and swollen.

Treatment:

- 1) Voice rest and avoidance of smoking.
- 2) Simple analgesia, Steam inhalations and Simple cough suppressants.
- 3) Antibiotics: When there is secondary infection with fever and toxemia or purulent expectoration. Give **penicillin v 500mg q6hr for 1 week**.

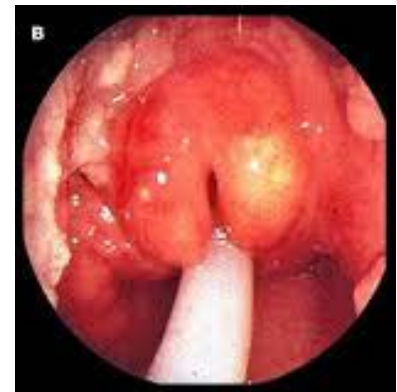
8. Acute Epiglottitis

Description: endoscopic photograph show oedematous, cherry red epiglottis with inflammation of the surrounding supraglottis.

Causes: **H. influenzae B**

Clinical Features

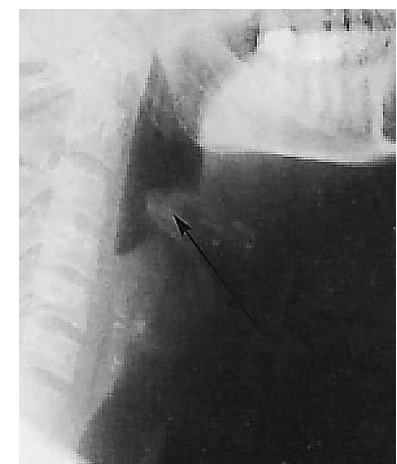
- Sore throat and dysphagia (in adults), Dyspnea and Inspiratory stridor (in children).
- High grade Fever
- Ill toxic look, muffled voice, marked cervical LAP.
- A child in distress, seated, and leaning forward with the mouth open and drooling.



Diagnosis lateral soft tissue x-ray of the neck which shows widening of the epiglottis called **thumb sign**.

Treatment:

1. Endotracheal intubation, Humidified oxygen
2. IV antibiotics
3. Steroid



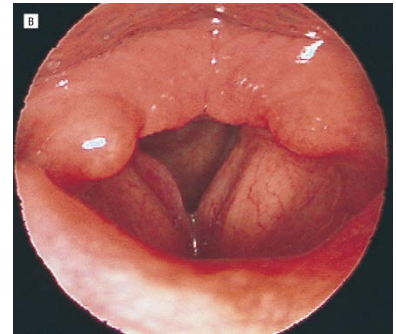
9. Edema of Larynx

Description:

Clinical Features

- Airway obstruction, Inspiratory stridor
- Indirect laryngoscopy shows oedema of supraglottic or subglottic region.

Treatment: Relieve airway obstruction, treat the cause.



10. Reinke's Edema

Description: bilateral symmetrical swelling of the whole of membranous part of the vocal cords.

Causes: misuse of voice, heavy smoking.

Clinical Features

- Hoarseness
- Vocal cords appear as fusiform swellings with pale translucent look. Ventricular bands may appear hyperaemic and hypertrophic.

Treatment:

1. Stop smoking, Voice rest
2. Speech therapy for proper voice production.
3. If no response then Surgery: cordotomy (or Decortication of the vocal cords).



11. Vocal Cord Nodules (singer's nodules)

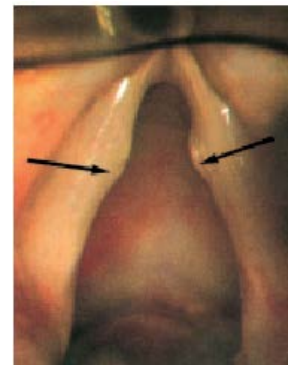
Description: Bilateral whitish lesions at the junction of the anterior one third and posterior two thirds of the V.C.

Causes: vocal abuse or misuse

Clinical Features: Hoarseness, vocal fatigue and pain in the neck on prolonged phonation.

Treatment:

1. Speech therapy.
2. If no response: then microlaryngeal surgery.



12. Vocal cord Polyp

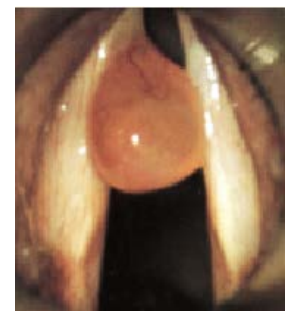
Description: unilateral, pedunculated lesion, most common between middle and anterior thirds of vocal cord.

Causes: misuse of voice, heavy smoking.

Clinical Features: Hoarseness

Treatment:

1. Surgical excision,
2. Postoperative speech therapy,
3. Avoidance of the risk factors.



13. leukoplakia

Description: a white plaque on the cord

Definition: a localized form of epithelial hyperplasia involving upper surface of one or both vocal cords.

Clinical Features: Hoarseness

Treatment: Stripping of vocal cords and subjecting the tissues to histology

Complications: precancerous condition because “carcinoma in situ” frequently supervenes.



14. Vocal Cord Granuloma

Description: red or grey granulation tissue in the interarytenoid region and posterior thirds of vocal cords

Causes:

- Smoking, Excessive forceful talking
- Gastro-oesophageal reflux disease.
- Trauma from the intubation

Clinical Features Hoarseness

Treatment:

1. Conservative: control of acid reflux and speech therapy.
2. Removal of granulation tissue under operating microscope



15. Papilloma

Description: solitary or often multiple warty lesions with an irregular surface on flexible nasolaryngoscopy

Cause: Human papilloma virus types 6 and 11

Clinical Features: Hoarseness, stridor, chronic cough, respiratory infections, FTT.

Treatment:

1. Microlaryngoscopy and CO2 laser excision
2. Adjuvant therapy: Intralesional cidofovir and Systemic alpha interferon.



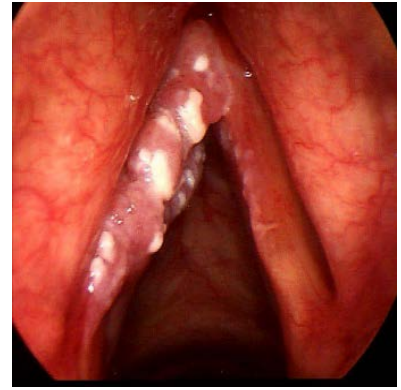
16. Laryngeal Carcinoma

Description:

Types: 90-95% of laryngeal CA is SCC

Sites

1. **Supraglottic CA (47%):** often silent, **Throat pain, dysphagia and referred pain in the ear or mass of lymph nodes in the neck. Hoarseness,** Weight loss, respiratory distress, halitosis are late features.
2. **Glottic tumour: (50%):** **Hoarseness,** early presentation, causes stridor and laryngeal obstruction.
3. **Subglottic tumour:** **stridor or airway obstruction**



C/E: Progressive continuous hoarseness, Dyspnea and stridor, Pain and dysphagia, swelling in neck.

Diagnosis:

1. **History:** any patient in cancer age group having persistent or gradually increasing hoarseness for 3 weeks must have laryngeal examination to exclude cancer.
2. **Indirect laryngoscopy and Direct laryngoscopy:**
 - (a) **Appearance of lesion**
 - 1) **Lesions of suprahoid epiglottis** are usually exophytic
 - 2) **Lesions of infrahyoid epiglottis** are ulcerative.
 - 3) **Lesions of vocal cord** may appear as raised nodule, ulcer or thickening.
 - 4) **Lesions of anterior commissure** may appear as granulation tissue.
 - 5) **Lesions of subglottic region** appear as a raised submucosal nodule, mostly involving the anterior half.
 - (b) **Vocal cord mobility.** Impairment or fixation of vocal cord indicates deeper infiltration.
 - (c) **Extent of disease**
3. Flexible fibreoptic or rigid laryngoscopy
4. Neck examination: It is done to find (i) extralaryngeal spread of disease and (ii) nodal metastasis.
5. Radiology like.: CXR, CT-SCAN, MRI
6. Biopsy

Treatment:

1. **Radiotherapy:** Curative radiotherapy is reserved for early lesions which neither impair cord mobility nor invade cartilage or cervical nodes.
2. **Surgery:**
 - a. Conservation laryngeal surgery.
 - b. Total laryngectomy.
3. **Combined therapy:** Surgery with pre-or postoperative radiotherapy.
4. Endoscopic CO2 laser excision.
5. **Organ preservation:** induction chemotherapy followed by radiotherapy or concurrent chemoradiation showed better locoregional control of disease than laryngectomy with postoperative radiotherapy. It also had the advantage of preservation of laryngeal function.

17. Immobile Vocal Cord

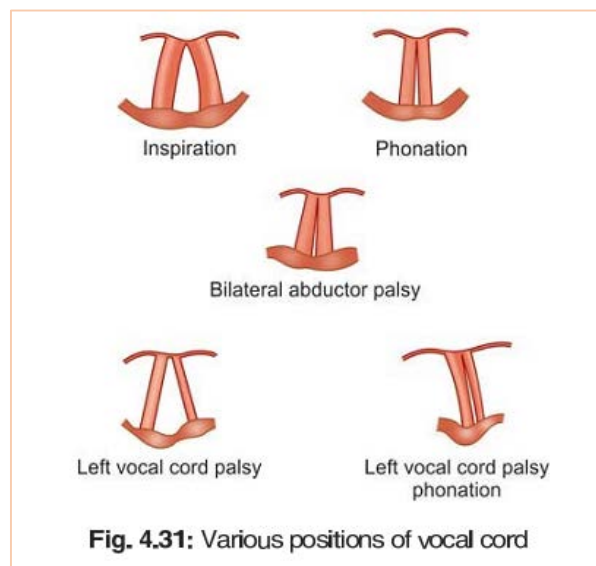
Causes:

1. Idiopathic.
2. Surgery (thyroidectomy).
3. Neoplasia (thyroid, malignant cervical nodes, ca of esophagus, hypopharynx, or bronchus)
4. Aortic aneurysm, TB.
5. Brainstem cause (CVA, trauma, tumour)
6. Systemic neurological or neuromuscular conditions: MS or muscular dystrophy

Clinical Features

- Weak, breathy voice, a poor ineffective cough, aspiration is common.
- **Position of the vocal cord**

<i>Position of the cord</i>	<i>Health</i>	<i>Disease</i>
Median	Phonation	RLN paralysis
Para-median	Strong whisper	RLN paralysis
Intermediate	-	Paralysis of both recurrent and superior laryngeal nerves
Gentle Abduction	Quiet respiration	Paralysis of adductors
Full abduction	Deep inspiration	



Treatment: Phonosurgery

Blank paper

Common cases of Salivary Glands

1. Mumps

Causative agent: Paramyxovirus

Clinical Features

- Fever, malaise, anorexia and muscular pain.
- Parotid swelling

Treatment:

- 1) Proper hydration, rest, analgesics and cold or hot compresses over the parotid to relieve pain.
- 2) Food which encourages salivary flow should be avoided

Complications: SNHL, orchitis, pancreatitis, meningitis, and encephalitis



2. Acute Suppurative Parotitis

Causative agent: staphylococcus aureus, streptococcus pyogenes

Clinical Features

- Sudden, severe pain and enlargement of gland.
- Movements of jaw aggravate the pain.
- **Tense shiny red overlying skin**
- Opening of the Stensen's duct is swollen and red and may be discharging pus

Treatment:

- 1) Appropriate antibiotics
- 2) Fluid and heat
- 3) Salivary stimulant (vit. C)
- 4) Surgical drainage if persistent symptoms in spite of adequate medical management.



3. Salivary Calculi (Sialolithiasis)

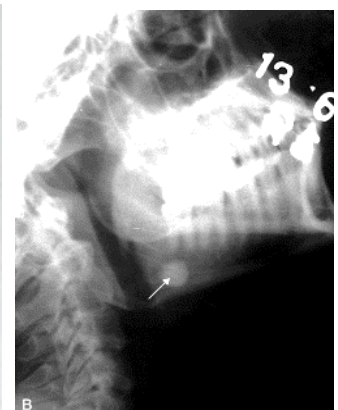
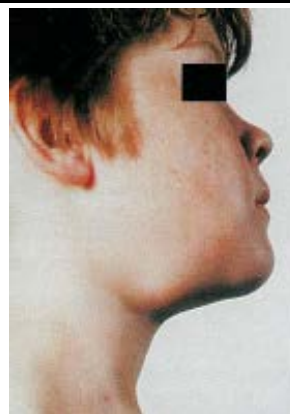
Causes: 92% occurs in submandibular gland duct due to direction of the duct and Type of secretion (mixed and mostly it's mucinous and rich in Ca.)

Clinical Features

- **Intermittent swelling** of the involved gland
- **Pain** due to obstruction to outflow of saliva.

DX: Plain X-ray, Sialography

Treatment: Removal of the stone or the gland as a whole.



4. Pleomorphic Tumor

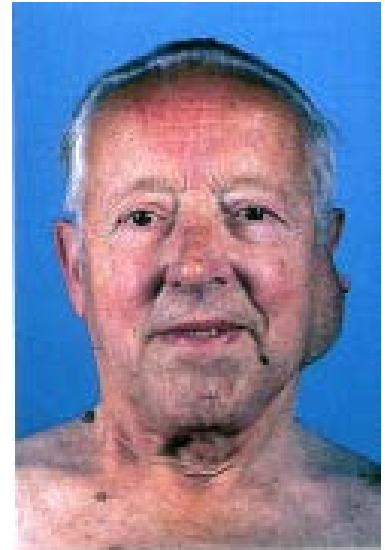
Clinical Features

- Age common in 5th decade
- Painless, slowly growing mass.
- Cystic to firm in consistency. No tenderness, No signs of inflammation

Dx:

1. CT-scan ± MRI
2. Biopsy: excisional biopsy or FNA
 - Comprises epithelial and mesodermal elements with a mucopolysaccharide stroma
 - Surrounded by *pseudocapsule*

Treatment: Excision with safe margin



Adenoid cystic carcinoma

Clinical features:

- Mass in the corresponding glands ± Facial pain and sometimes numbness
- *Facial palsy*
- Firm to solid in consistency and may be attached to the underlying structure.
- LN metastasis is very late, and distance metastasis is very rare.

Treatment: Surgery and radiotherapy

Head and neck spaces infection

1. Ludwig's Angina

Definition: infection of submandibular space (both submaxillary and sublingual spaces)

Causes:

1. Dental infections: molar infection (80% of cases)
2. Soft tissue or tonsillar infection (20% cases)
3. Submandibular sialadenitis
4. Injuries of oral mucosa
5. Fractures of the mandible

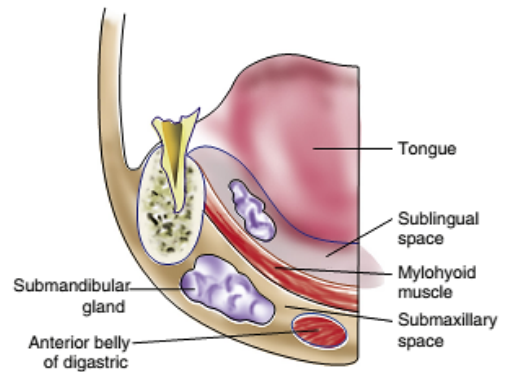
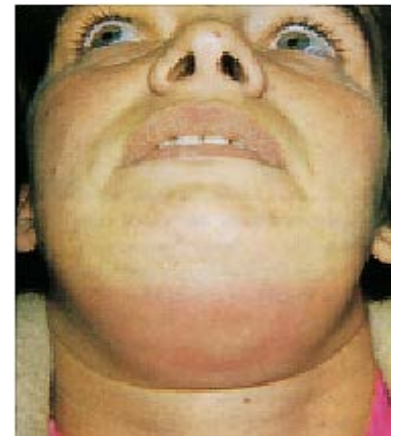


Figure 52.1 Anatomy of submandibular space.

Clinical Features

- High-grade fever, trismus, excessive salivation and odynophagia
- **Sublingual space infection:** structures in the floor of mouth are swollen and tongue seems to be pushed up and back.
- **Submaxillary space infection:** submental and submandibular regions become swollen and tender, and impart woody-hard feel (cellulitis and not an abscess).
- Dyspnea and stridor due to glottic edema



Treatment:

1. Systemic antibiotics.
2. Extraction of inciting teeth (if identifiable)
3. Tracheostomy : if airway is compromised
4. Incision and drainage if abscess formed.

2. Parotid Abscess

Definition: Suppuration of the parotid space

Clinical Features

- Unilateral Swelling, redness, indurations and tenderness in the parotid area and at the angle of mandible.
- Opening of the Stenson's duct becomes congested and may exude pus on pressure over the parotid.

Dx: U/S or CT scan

Treatment:

1. Intravenous antibiotics
2. Surgical drainage



3. Retropharyngeal Abscess

Description:

Causes:

1. Suppurative infection of the retropharyngeal lymph nodes draining ear, nose and throat.
2. Trauma or iatrogenic causes, e.g. endoscopic procedures or oral surgeries.

Clinical Features

- Fever, malaise, poor appetite, irritability
- Dyspnea and Dysphagia
- Neck rigidity, tenderness and torticollis
- Unilateral bulge is seen in the posterior pharyngeal wall.

Dx: lateral view of the neck shows widening of prevertebral shadow.

Treatment:

1. Incision and drainage of abscess
2. Systemic antibiotics



4. Parapharyngeal Abscess

Description:

Causes:

1. **Pharynx.** Acute and chronic infections of tonsil and adenoid, bursting of peritonsillar abscess.
2. **Teeth.** Dental infection usually comes from the lower last molar tooth.
3. **Ear.** Bezold abscess and petrositis.
4. **Other spaces.** Infections of parotid, retropharyngeal and submaxillary spaces.
5. **External trauma.** Penetrating injuries of neck, injection of local anaesthetic for tonsillectomy or mandibular nerve block.

Clinical Features

- Fever, odynophagia, sore throat, torticollis and signs of toxemia
- Anterior compartment infections: Prolapse of tonsil and tonsillar fossa, Trismus (due to spasm of medial pterygoid muscle), External swelling behind the angle of jaw.
- Posterior compartment Infection: Bulge of pharynx behind the posterior pillar, Paralysis of CN IX, X, XI, and XII and sympathetic chain, swelling of parotid region.

Treatment:

1. Systemic antibiotics
2. Drainage of abscess



Neck Masses

1. Branchial Cyst

Clinical Features:

- Age common in late teens
- Asymptomatic swelling in the upper part of the neck at the anterior border of the sternomastoid muscle, smooth, round, fluctuant, non-tender and non-transilluminant.
- Pain is infrequent unless a secondary infection occurs.
- May be associated with a sinus or a fistula.

DDx: haemangiomas, lymphangiomas, thymic cyst, lymphomas, metastatic thyroid Ca & dermoids.

Treatment: Cyst or fistulous tract must be excised completely, when it is quiescent.



2. Cystic Hygroma

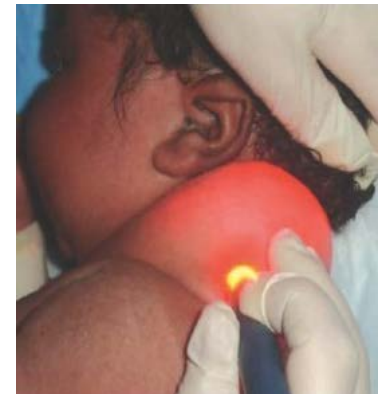
Clinical Features:

- 90% are detected by age 2 year. Asymptomatic cystic hygromas are soft, multilobular & usually ill-defined and brilliantly transilluminant.
- They can occur in any anatomic region of the head & neck. Most commonly in the posterior triangle of the neck.

Diagnosis:

1. Aspiration produces a straw-colored fluid.
2. Transillumination
3. CT scanning (define areas of involvement).

Treatment: surgical excision



3. Laryngocele

Clinical Features:

- Presents at the side of the neck over the thyrohyoid membrane. It may be easily inflated & emptied of air & it shows a characteristic radiographic appearance.



4. Carotid Body Tumor

Clinical Features:

- Usually present between the 3rd & 6th decades as slowly enlarging mass in the area of the carotid bifurcation. firm rubbery masses pulsatile, on the side of the neck & deep to sternomastoid muscle (upper third)

Dx: angiography

5. Thyroglossal Duct Cyst

Clinical features:

- A midline mass at or just beneath the hyoid bone, Smooth & well demarcated, can be moved sideways only and it also moves upward on protruding the tongue or on deglutition.

DDx: Dermoid cysts, benign lymphadenopathy & sebaceous cyst.

Complications: Infection, Fistula formation, Malignancy transformation.

Treatment: complete surgical excision, including with it the body of hyoid bone. (Sistrunk's operation)

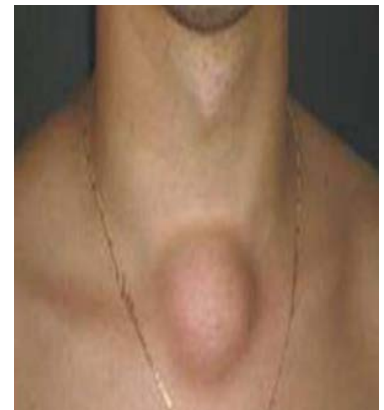


6. Dermoid cyst

Clinical Features:

- A painless, slowly enlarging midline mass, well demarcated, non-tender & rubbery to palpation, it is not mobile on swallowing. Contain skin appendages.

Treatment: surgical excision



7. Hemangioma

Clinical Features:

- Usually present soon after birth. the cutaneous lesions are extremely red (strawberry haemangioma), the deeper lesions frequently Blanche with pressure

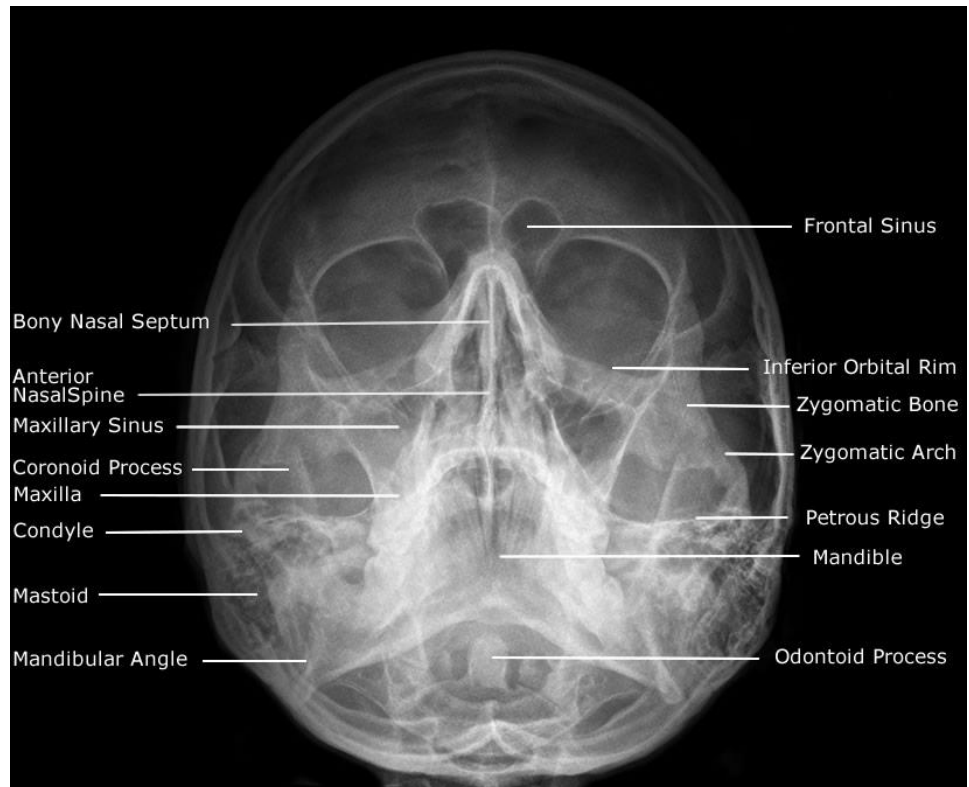
Treatment: 90% resolve spontaneously in 1st 2 years.

Radiology in ENT

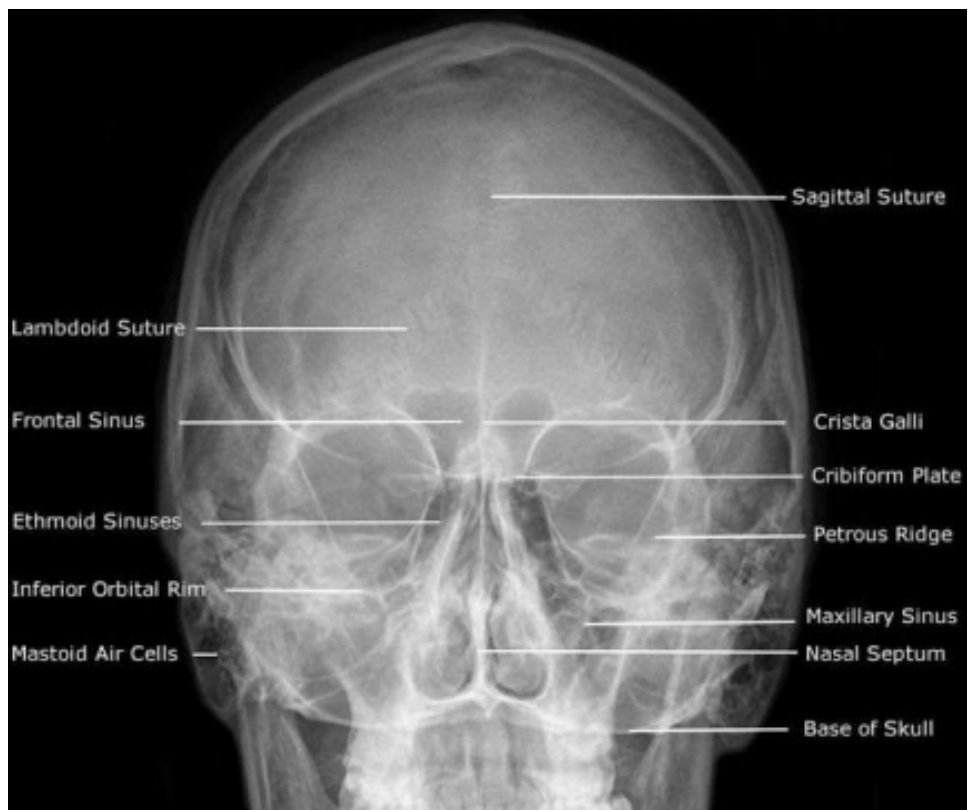
1. Paranasal Sinuses

Plain X-ray

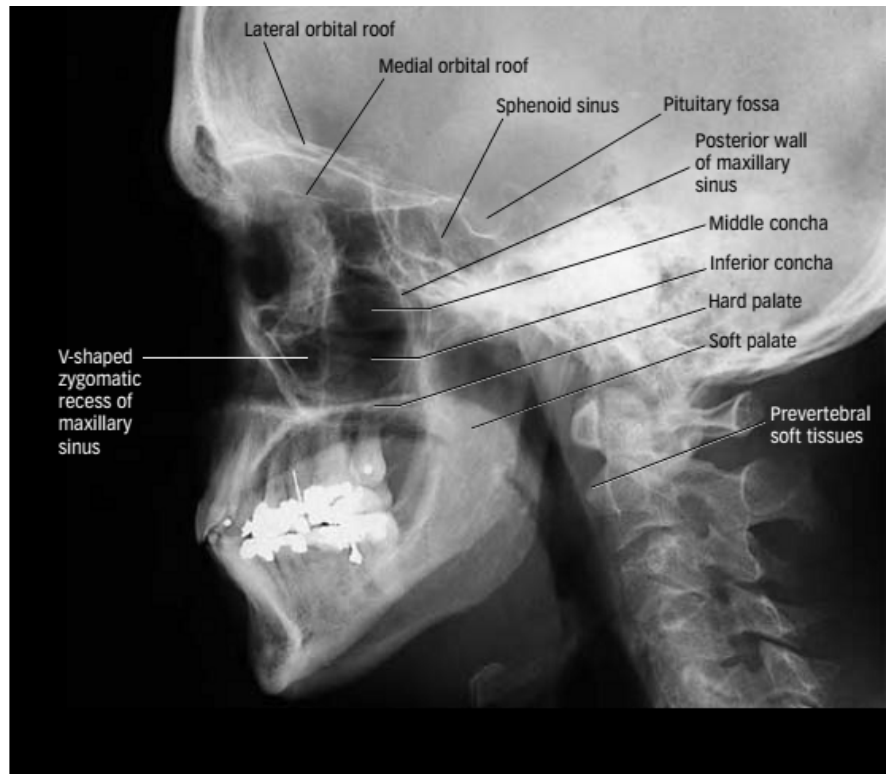
- a) **Waters' view** (occipitomental view or nose-chin position) – Best for Maxillary S.



- b) **Caldwell view** (Occipitofrontal view or nose-forehead position) – Best for ethmoid and frontal S.



c) **Lateral view**



Common radiologic abnormalities:

- 1) Air-fluid levels suggest an acute process
- 2) Opacification = secretions, polyps.
- 3) Thickened mucosa (check lateral maxillary wall): Suggests chronic inflammation
- 4) Maxillary sinus retention cysts
- 5) Frontal sinus mucocele: Look for loss of scalloped edge

CT-scan

a) Coronal section

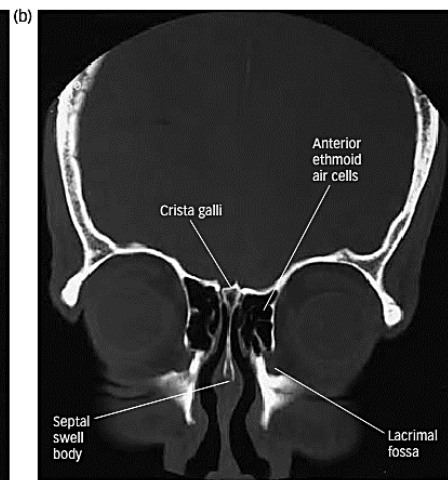
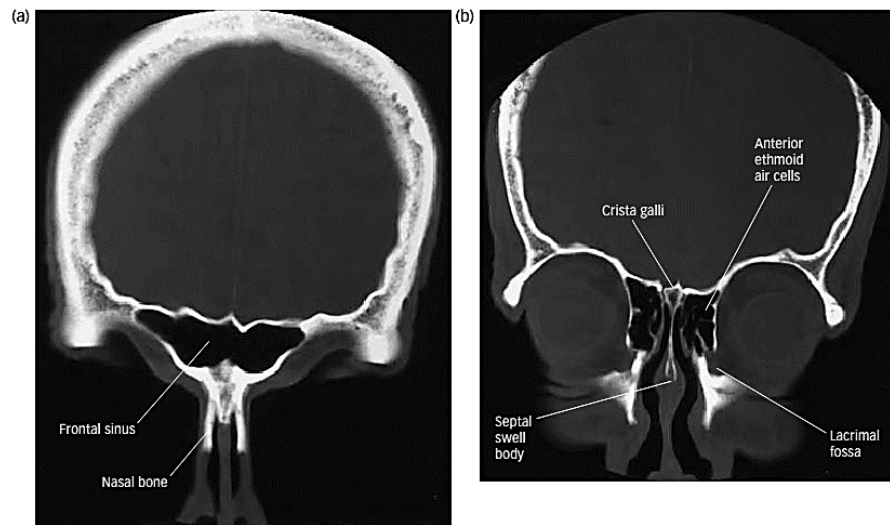
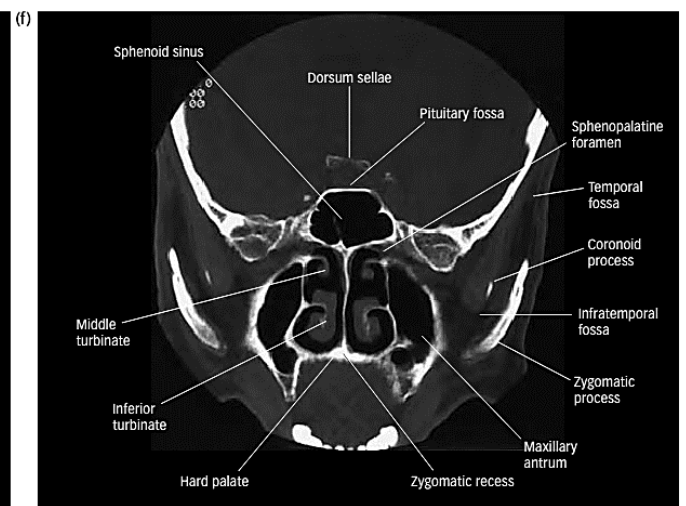
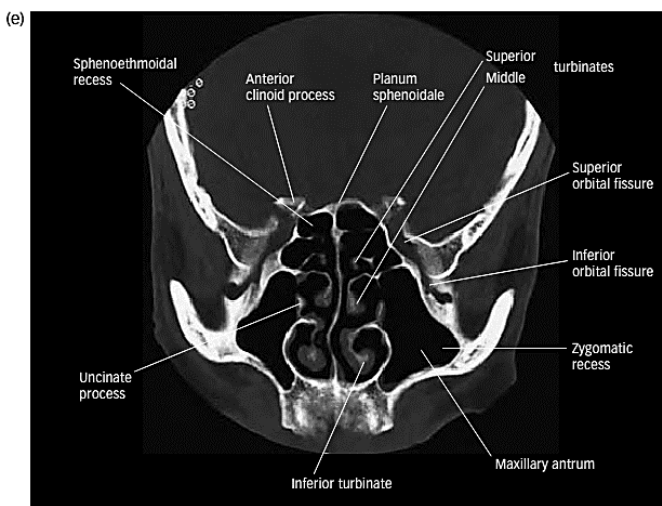
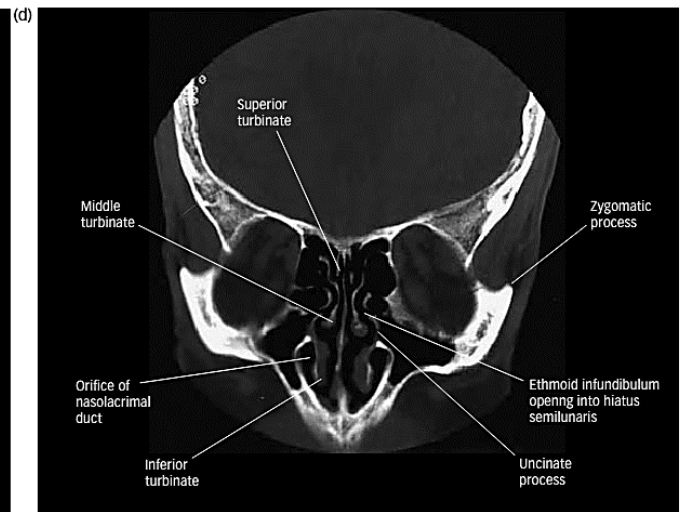
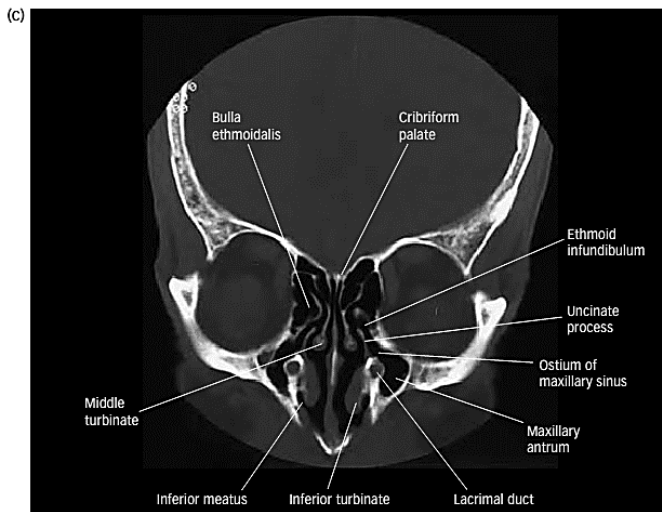
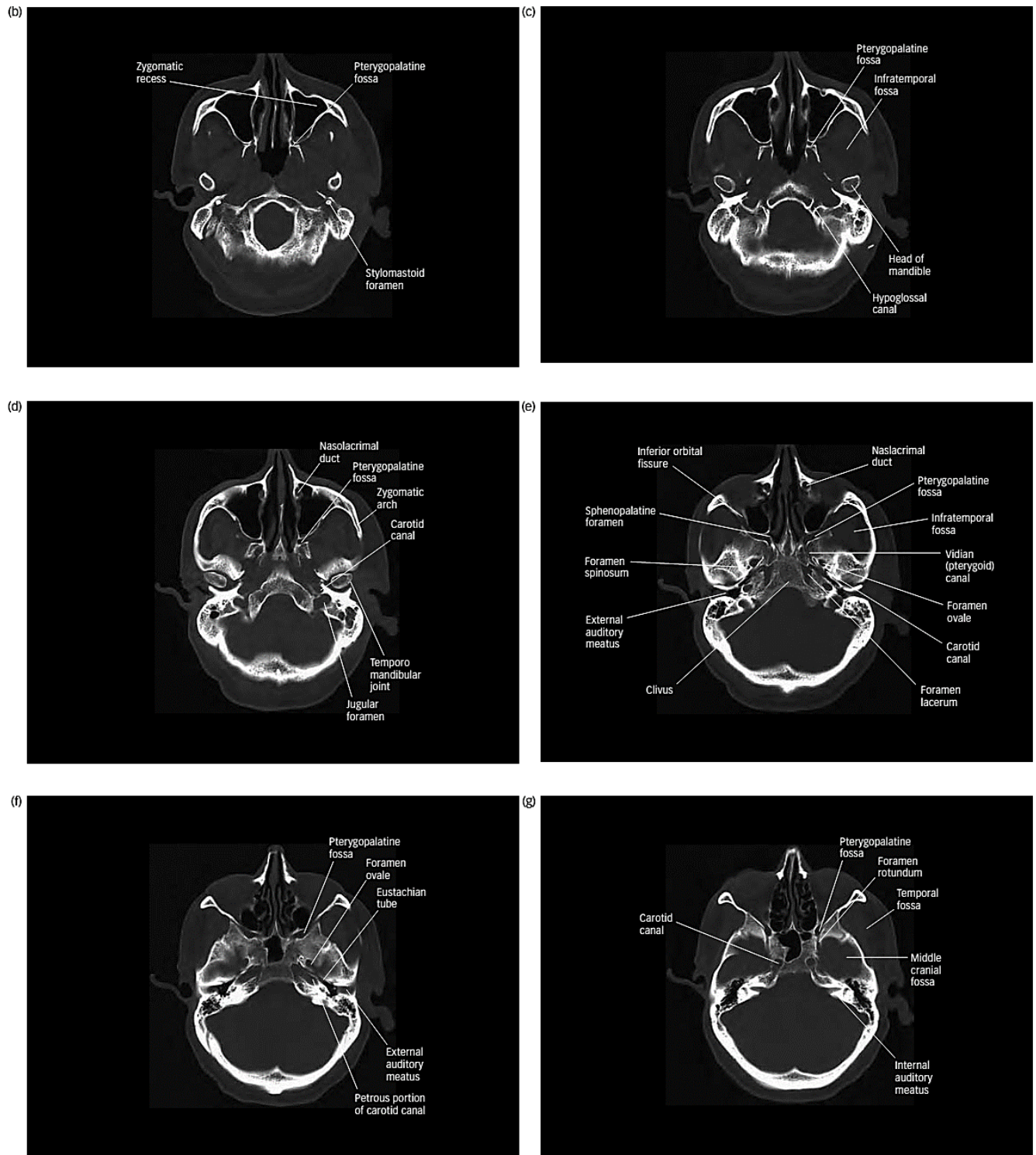


Fig. 10.9(a)-(f). Coronal CT series on bone window settings demonstrating the anatomy of the paranasal sinuses and ostiomeatal complex from anterior (a) to posterior (f).



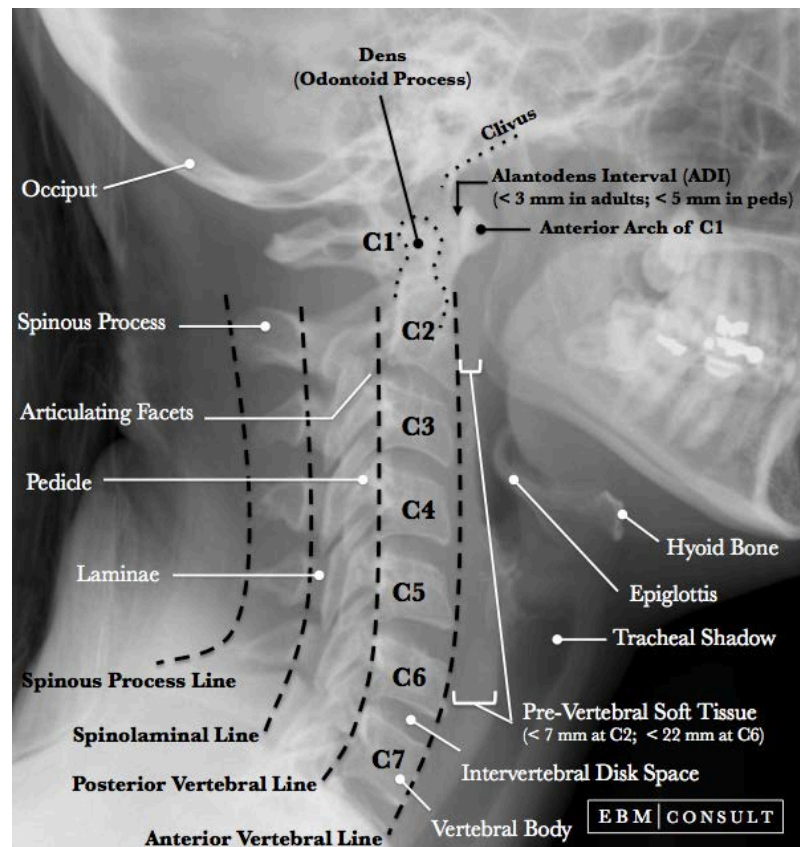
b) Axial Section



2. Neck, Larynx and Pharynx

a) Lateral view of neck

- 1) Cervical vertebrae
 - Erosion of vertebral bodies
 - Loss of cervical Lordosis – due to prevertebral muscle spasm
- 2) Pre-vertebral soft tissue shadow
 - Should be $< 2/3$ of AP diameter of cervical vertebral body (C2: 6mm/ C6:22 mm)
 - If $>$ suspect Retropharyngeal abscess
 - Look for FB / Air fluid level / Gas shadow
- 3) Air column in trachea
- 4) Hyoid bone & Laryngeal cartilage ossifications



b) Anteroposterior view of neck

- c) **Soft tissue lateral view of nasopharynx** – to assess soft tissue masses in the nasopharynx, e.g. adenoids, antrochoanal polyp or angiofibroma